PURDUE UNIVERSITY
CALUMET CAMPUS
ANNOUNCEMENTS 1976-1977

Calendar

1976

JANUARY

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FEBRUARY

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1977

SEPTEMBER

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Spring Semester

January 19
Classes begin
March 13
Spring vacation begins
March 22
Classes resume
May 8
Classes end and reading period begins
May 10
Final exams begin
May 15
Final exams end
May 23
Commencement

Summer Session

June 14
Classes begin
July 5
Holiday
August 3
Classes end and reading period begins
August 4
Final exams begin
August 5
Final exams end

Fall Semester

August 16
Classes begin
September 6
Labor Day, no classes
October 9
Fall recess
October 13
Classes resume
November 24
Thanksgiving vacation begins
November 29
Classes resume
December 11
Classes end and reading period begins
December 13
Final exams begin
December 17
Final exams end

CALUMET CAMPUS

Announcements for the Year 1976-77

PURDUE UNIVERSITY

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PURDUE UNIVERSITY

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Richard L. Yates, Ph.D. ..... Executive Assistant to the Chancellor

General Information

The year 1976 marks 107 years of growth and progress for Purdue University. From an instititution of six instructors and 39 students, Purdue, Indiana's land-grant college, has grown to a major university with a faculty of more than 2,100 and a student body of more than 35,000 on four campuses.

Purdue has established, largely since World War II, a series of regional campuses for the purpose of offering educational opportunities in the major population areas of Indiana. The Calumet Campus, the largest of the regional campuses, primarily serves the communities located in the northwestern part of the state. This area — the industrial heartland of the Midwest — is adjacent to metropolitan Chicago and is situated in the southeastern section of Hammond, just off the Borman Expressway and Indianapolis Boulevard.

HISTORY

Purdue University has been a part of the Calumet region's educational community for many years, growing with the educational needs of the area and the nation. Purdue's Calumet operation began in what was almost a casual fashion, as extension classes, short term projects, and other special events, taking advantage of already existing physical facilities in the area.

The first major change came in 1943, when the pressures of production for World War II rapidly increased the needs of the area's industries for skilled craftsmen and technicians. A series of technological programs were instituted under the War Manpower Training Act, in which Purdue, as a land-grant college, participated.

In 1946, first steps toward permanent operations of the University in the Calumet area were undertaken with the appointment of resident faculty and the offering of regular undergraduate courses. By 1948, University administrators and other community leaders were certain that the rapid growth of higher education was to be a feature of the nation's life, and so purchased, in part with money contributed by Calumet area businesses and individuals, land totaling about 167 acres, bounded by the Calumet Expressway, 169th Street, Woodmar Avenue, and a line running variously from Wicker Avenue to the New York Central tracks. In 1951 Purdue moved into the first building on its permanent site. In 1954, the Industrial Research Institute building was completed. The funds for these buildings came, for the most part, from the University's Ross-Ade Foundation. A small parcel of land was transferred to the state of Indiana for the building of the National Guard Armory, which was also to provide physical training facilities for Purdue students. A $2.5 million addition to the original campus building was opened for use in 1963. Since that time building has been continuous following a master plan for total campus development of the original 1948 purchase to meet the growing educational needs of the Calumet region. The present air-conditioned physical facilities—including an ever-growing library, modern laboratories and lecture halls, spacious classrooms, well-appointed lounges and study halls, and closed-circuit television facilities—form but part of a rapidly expanding campus. The granting of academic autonomy to Purdue Calumet on July 1, 1974 provides the opportunity to present unique programs of study that will better service the needs and

interests of the citizens of the Calumet region. Indeed, growth in student body and in breadth of offerings will add still further chapters in the University's history of service to the community.

PURPOSE AND FUNCTION

The Purdue University Calumet Campus espouses the spirit of the land-grant university tradition and is especially dedicated to the service of the people of northwest Indiana within the charter given to Purdue University. At this time its primary mission is threefold: to provide its students with a liberal education that will prepare them for life or the professions; to provide career-oriented studies that lead to certificates, associate degrees, and the baccalaureate degrees; and to provide programs that meet the professional, cultural, and general educational needs of the community.

To fulfill this mission the Board of Trustees has authorized the Calumet Campus to institute, when needed, any of the undergraduate programs traditionally a part of Purdue's programs. Under this grant of authority the Calumet Campus held its first commencement in June 1967.

Within its goal of providing a liberal education and preparing students for the professions, the Calumet Campus offers baccalaureate programs in a wide range of disciplines such as communication, engineering, English, history, mathematics, chemistry, German, political science, and psychology. Baccalaureate programs which are more career related include elementary and secondary teaching, construction technology, manufacturing technology, supervision technology, and electrical technology. To provide for the professional, cultural, and general education needs of the community, the campus regularly offers various types of continuing education, dramatic performances, and concerts, as well as graduate programs offered in conjunction with the West Lafayette Campus.

In accordance with a long-standing policy of the Board of Trustees, all educational services and programs of the University are available and open to all academically qualified individuals without any discrimination whatsoever with respect to creed, national origin, race, or sex.

ORGANIZATION

Purdue Calumet functions as an integral part of Purdue University. Faculty members, numbering nearly 200 full-time and ranking from instructor to professor, are represented in policy formulation by an elected body called the Council of Faculty Delegates. They normally hold appointments in the school of Basic and Applied Sciences or the school of Humanities, Education and Social Sciences.

A single Board of Trustees governs the entire Purdue University system through the President of the University. The senior administrative officer at Purdue University Calumet Campus is the Chancellor who reports directly to the President.

Diplomas are awarded by "Purdue University, at Hammond, Indiana."

LIBRARY AND AUDIO-VISUAL SERVICES

The Library and Audio-Visual Services are located on the second floor of the Student-Faculty Library Center. The library collection now contains ap-

proximately 92,000 physical volumes, approximately 1,100 periodical subscriptions, 6,000 microfilm reels, and 130,000 microfiche cards which represent an estimated 35,000 additional volumes, thus bringing a combined physical volume and microfilm count to 127,000 volumes. Open 84 hours a week with Saturday and Sunday hours, the library provides seating for 600 students with individual carrel seating for 300. Reference, copy, and interlibrary loan services between the Purdue campuses are available to all students and faculty members. In addition to an audio-tutorial laboratory, the Audio-Visual Service acts as the film booking agent for faculty and students. Audio-visual equipment may be reserved for class, club, or campus organization use.

COURSE OFFERINGS AND DEGREES AUTHORIZED AT PUCC

1976-77 Academic Year

Major	2 Years	3 Years	Bachelor's Degree	Graduate Level
BASIC AND APPLIED SCIENCES				
Agriculture	X			X
Architectural Technology	AAS			
Biology			BS	X
Biology Teaching			BS	MS
Chemical Technology	AAS			
Chemistry			BS	X
Chemistry Teaching			BS	X
Civil Engineering Technology	AAS			
Computer Technology	AAS		BS	
Construction Technology			BS	
Economics			BS	X
Electrical Technology			BS	
Electrical Engineering Technology	AAS			
Engineering			BSE	MSE
Forestry	X			
Industrial Arts Education	1 Year			
Industrial Engineering Technology	AAS		BS	
Industrial Management			BSIM	MS
Math			BS	X
Math Teaching			BS	MS&MAT
Mech. Drafting Design Technology	AAS			
Mechanical Engineering Technology	AAS			

COURSE OFFERINGS AND DEGREES AUTHORIZED AT PUCC—Continued

Major	2 Years	3 Years	Bachelor's Degree	Graduate Level
Mechanical Technology			BS	
Medical Technology			BS	
Metallurgical Technology	AAS			
Nursing	AAS		BS	
Physics			BS	X
Physics Teaching			BS	X
Predentistry			BS	
Premedicine			BS	
Prepharmacy	1 Year			
Preveterinary Science	X			
Supervision	AAS		BS	
Technical Teaching		X		X
Voc. Ind. Teaching		X		X
All others	X			
COMMUNITY COLLEGE				
Child Day Care	AA			
All Others	X			
HUMANITIES, EDUCATION, AND SOCIAL SCIENCES				
American History			BA	MA
American Literature			BA	MA
Communication			BA	X
Education				MS
Educational Media		X		MS
Elementary Education			BA	MS
English Literature			BA	MA
English Teaching			BA	MA
European History			BA	MA
French		X		X
German			BA	X
German Teaching			BA	X
Home Economics	X			X
P. E. for Men			BPE	X
Political Science			BA	X
Psychological Sciences			BS	X
Social Studies Teaching			BA	X
Sociology			BA	X
Spanish		X		X
Speech Teaching			BA	X
All others	X			

ADMISSIONS

GENERAL UNDERGRADUATE ADMISSIONS REQUIREMENTS

All persons wanting to take advantage of the opportunity for higher education at the Calumet Campus of Purdue University must file an application for admission. Requests for information and application forms should be addressed to the

Office of Admissions
Purdue University Calumet Campus
2233 171st Street
Hammond, Indiana 46323

Students pursuing the baccalaureate degree, associate degree, and credit certificate programs must be high school graduates. A prospective student would complete the application according to instructions and then forward the form to the high school from which he is to be or already has been graduated. The high school should then complete the application and return it to the Office of Admissions at the Calumet Campus.

A high school student should make application during his seventh semester of high school or as soon as possible thereafter. A high school graduate should make application immediately. This enables the University to fully evaluate an applicant's eligibility for consideration to the school or curricula of his choice at the Calumet Campus and to notify the applicant at an early date of the action taken, thus allowing the applicant to follow through with his educational plans.

An individual's eligibility for consideration to the school of his choice or curricula of his choice will depend upon many factors, among which are:

1. Subject matter requirements for the school or curricula to which he is applying;
2. High School class standing;
3. College Entrance Examination Board (CEEB) Scholastic Aptitude Test (SAT) results:
4. High school comments and recommendations
5. Previous college work, if any; and
6. Other personal information.

Explanation of Eligibility Facts.

1. Subject Matter Requirements—The following table shows the minimal requirements for each school or curriculum within the University.
   High school students who desire to study engineering, mathematics, chemistry, or physics should establish credit in the following high school subjects in addition to the minimum requirements in order to graduate in eight semesters: A fourth year of advanced mathematics a full year of both physics and chemistry.

2. High School Class Standing—Applicants seeking admission to the curricula of engineering, home economics, administrative sciences, or science are expected to rank in the upper half of their high school graduating class. Applicants seeking admission to the various curricula of technology, agriculture and to physical education are expected to rank in the upper two-thirds of their high school graduating class. The Community College will consider for admission individuals with high school diplomas or equivalent.
3. College Entrance Examination Board (CEEB) Tests—Applicants who have not completed a full year of college study should submit their results of the Scholastic Aptitude Test (SAT) or Illinois residents may submit the American College Test (ACT). SAT or ACT results from junior year test date or results from a test date in the senior year are acceptable. Beginning freshmen planning to continue a foreign language course previously taken in high school must take Purdue's modern language placement test. Information about the modern language placement test is available from the Office of Admissions.

On the basis of the factors considered, action on the individual's application may be one of the following:

1. Granted Unqualified Regular Admission—This means that the applicant has met all entrance standards and requirements for admission to the school or curriculum for which he applied.
2. Admitted on Probation—This applies to the Applicant whose academic background and preparation does not meet the entrance standards and/or requirements, but who the University feels has a reasonable chance for success in a specific Purdue program.
3. Admission Deferred—This applies to the applicant who fails to submit all the admission credentials required for registration.
4. Admissions denied or postponed until an adequate academic background or preparation can be demonstrated.

Any admission to the University is provisional pending the receipt of all required student information.

SCHOOL OR CURRICULA	1 Unit Algebra	½ Unit Adv. Alg. ½ Unit Trigonometry	1 Unit Plane Geometry	1 Unit Lab Science	Yrs of English	4 semesters Foreign Language	1 Unit Social Sciences	Total of not less than 15 units
Basic & Applied Sciences								
Administrative Sciences	x	x	x	x	3		x	x
Agriculture	x		x	x	3		x	x
Engineering	x	x	x	x	3		x	x
Forestry	x	x	x	x	3		x	x
Science	x	x	x	x	3		x	x
Technology	x		x	x	3		x	x
Community College	No Specific subjects required; high school diploma, or its equivalent is required for admission							
Humanities, Ed. & Social Science								
Home Economics	x		x	x	3		x	x
Physical Education				x	3		x	x
All other HESS curricula	x		x	x	4	x*	x	x

* Qualified HESS applicants, lacking only the required two units of foreign language, may remove this deficiency during their freshman year.

FINANCIAL AIDS

Students who require financial assistance to attend Purdue Calumet may apply for aid from the Office of Financial Aids. Eligible students receive financial aid from funds provided to the University by the federal and state governments, community organizations, local industries, and by Purdue Calumet.

The Application Process

In order to be considered for financial aid a student must be admitted to Purdue Calumet and must complete the appropriate financial aid application forms. All students who need assistance are encouraged to apply.

The chart below lists the types of aid available, the qualifications for each, and the required application forms. Attention is called to the section on the chart showing the best filing date. This date is the latest date by which the particular form should be received. Forms received after the date shown will greatly reduce a student's chances of receiving financial aid.

TYPES OF AID	QUALIFICATIONS	REQUIRED APPLICATION FORMS AND BEST FILING DATE
1. Basic Educational Opportunity Grant	U. S. Citizen Greatest financial need 12 or more semester hours Did not attend college prior to April 1, 1973	Basic Educational Opportunity Grant Application by April 1
2. Supplemental Educational Opportunity Grant	U. S. citizen Greater financial need 6 or more semester hours Academic or creative promise	Purdue Calumet Financial Aid Application by March 1 Parents' Confidential Statement by February 1
3. College Work Study	U. S. citizen Great financial need 6 or more semester hours Potential to succeed academically	Purdue Calumet Financial Aid Application by March 1 Parents' Confidential Statement by February 1
4. National Direct Student Loan	U. S. citizen Financial need 6 or more semester hours	Purdue Calumet Financial Aid Application by March 1 Parents' Confidential Statement by February 1
5. Indiana State Scholarship	U. S. citizen Indiana resident Financial need 12 or more semester hours High scholastic achievement First-time applicant must be entering college freshman under 24 years old	Indiana State Scholarship Application by December 1 Parents' Confidential Statement by January 15

TYPES OF AID	QUALIFICATIONS	REQUIRED APPLICATION FORMS AND BEST FILING DATE
6. Indiana Educational Grant	U. S. citizen Indiana resident Financial need 12 or more semester hours First-time applicant must be entering college freshman under 24 years old	Indiana Educational Grant Application by December 1 Parents' Confidential Statement by January 15
7. Purdue Calumet Scholarship	U. S. citizen Financial need 12 or more semester hours High scholastic achievement	Purdue Calumet Financial Aid Application by March 1 Parents' Confidential Statement by February 1
8. Nursing Loan	U. S. citizen Financial need 6 or more semester hours Nursing Technology major	Purdue Calumet Financial Aid Application by March 1 Parents' Confidential Statement by February 1
9. Child-Of-Disabled Veteran Grant	U. S. citizen Indiana resident Either parent suffered a service-connected disability (Note that the applicant need not show financial need to qualify)	Child-Of-Disabled Veteran Application by June 1 Verification Letter from Veterans Administration by June 1

About the Required Application Forms:

1. The Basic Educational Opportunity Grant (BEOG) application is available from high school guidance counselors and from the Office of Financial Aids. The BEOG Application must be returned to the address on the envelope which accompanies the BEOG application.

2. The Purdue Calumet Financial Aid Application is available from the Office of Financial Aids and must be returned directly to the Office of Financial Aids at Purdue Calumet.

3. The Parents' Confidential Statement (PCS) is available from the Office of Financial Aids and from high school guidance counselors. The PCS must be returned to Evanston, Illinois.

4. The application for the Indiana State Scholarship and the Indiana Educational Grant is available only from high school guidance counselors. The application must be returned by the guidance counselor to the Indiana State Scholarship Commission.

5. The Child of Disabled Veteran (CDV) application is available from the Office of Financial Aids and must be returned to the Office of Financial Aids at Purdue Calumet. The Verification Letter which must also be filed, can be requested from the Veterans Administration.

A Note on Other Sources of Financial Assistance:

There are numerous clubs and community organizations that sponsor awards for students who plan to attend college. The requirements for these awards differ depending upon the specific awards. While most scholarships require high scholastic achievements, some demand only that the applicant is a hard worker who has initiative and who needs money for college. Check with your high school guidance counselor.

Several industries have Scholarship Programs for the sons and daughters of their employees. Check with your parents to see if either is employed by such a company.

A third source of funds is your church. Perhaps there is a scholarship for which you will qualify. Also, members of your church may be aware of other community sources of assistance.

The Awarding Period

Applications received in the Office of Financial Aids by March 1 will receive full consideration. Provided the University has received its allocations from the federal government by June 1, award letters will be mailed to students by July 1. A delay in funding notification from the federal government will result in a delay in mailing award letters.

Generally, awarding of financial aid is done once per year—during the summer. The award itself, however, is applicable to both the Fall and Spring semesters. A student who enters the University during the Spring semester and applied late for aid, has less chance of receiving financial aid through the University, since most, if not all, of the funds will have been allocated to students who attended the Fall semester also.

Should a student who has been awarded financial assistance decide to transfer to another college (including another Purdue Compus), his aid is *not* trans-

ferable to the other college unless the aid is provided by the State of Indiana, or by an agency which allows such transferance.

Any questions regarding this and other financial aid matters may be directed to the Office of Financial Aids.

NONRESIDENT ADMISSION

Out-of-state applicants must complete the same general requirements as Indiana residents. In addition, nonresident applicants should rank in the upper third of the high school graduating class or in the highest third of the SAT or ACT test in order to be eligible for consideration except for the Community College. Students who are not in the upper third but are in the upper half of their class (50th percentile to 66th percentile) may be given consideration. Nonresident transfer students must have a C+ average in all previous college work (see "Transfer Students" below).

TRANSFER STUDENTS

An applicant transferring from another college or university must fulfill the following requirements in order to be considered for admission:

1. Submit an application for admission on the prescribed form through the high school from which he was graduated, including the SAT or ACT test results.
2. Forward an official transcript of work done in institutions previously attended to the Office of Admissions and Financial Aids at the Calumet Campus.
3. Indiana residents only—Have a C average in all work done in institutions previously attended. Persons who do not have a C average will be eligible to enroll in the Community College.
4. Nonresidents only—Have a C+ average in all previous college work.

Credit earned at other institutions will be evaluated in terms of how it fulfills the graduation requirements at Purdue University. Evaluation of transcripts of credit is completed after a student is admitted to the University.

NONDEGREE

Any student who is registered in another college or university and wishes to attend Purdue during the same semester must submit a letter from the other institution approving the specific courses to be taken at the Calumet Campus. All students who have been previously enrolled in another institution must have a letter of good scholastic standing on file with the Office of Admissions prior to enrollment. Application for admission as a nondegree student should be made to the Office of Admissions and Financial Aids at the Calumet Campus.

High school seniors who desire to enroll part time must first secure an application for admission from their high school counselor and receive approval from their high school principal.

RE-ENTRY STUDENTS

A person in good standing who formerly has attended any Purdue campus, but has not been in attendance for one semester or more, must file an application for re-entry at the Registration Office or Graduate Office at least three weeks prior to registration for any given semester. Each individual situation will determine the status of the person's eligibility for re-entry. If eligible, the applicant will receive an Offer of Admission notifying him of his acceptance.

A re-entry form cannot be used by a person who has been formally dropped by this University. In such a situation he should apply for re-admission through the Dean of Students' Office.

ADVANCED CREDIT

The University is anxious to give recognition in the form of advanced standing and credit to students who have successfully completed college-level work in their high schools. There are three basic ways in which credit may be established:

1. College Board Advanced Placement Tests—Credit may be established on the basis of test results taken at the completion of the advanced placement course in high school. Students should have the results forwarded to the Office of Admissions at the Calumet Campus.
2. Purdue Advanced Credit Examinations—Students may be invited to take special examinations in various subject matter areas as determined by evidence of competency on high school record, SAT's and college board achievement tests in English, mathematics, and chemistry, and semesters of high school subjects.
3. College Level Examination Program—CLEP is designed for the purpose of evaluating nontraditional college-level education such as independent study, correspondence work, and credit earned from nonaccredited institutions. Purdue credit may be established by taking certain subject matter examinations. Contact the Office of Admissions for a list of the approved examinations and the score required to establish credit.

Advanced standing and credit should not be confused with placement. Placement involves having students start at the correct level of a course within the freshman sequence. High school record, CEEB, SAT, and achievement test results are employed in making these placements. Placement involves no advanced credit.

AUDITING CLASSES

Courses may be audited. No grades or credits are received. Attendance in class is permissible when the regular class fees are paid and the individual has declared himself as an auditor. Auditors may register only during the week of late registration.

REGISTRATION

ADVANCE REGISTRATION

Current students should preregister for fall, spring, and summer sessions at announced times. New students should preregister at the time specified by the registration officer. Advance registration eliminates standing in line and assures preferential scheduling.

DELAYED REGISTRATION

For students who are unable to preregister, a registration period is held just prior to the beginning of classes. Consult the current semester schedule for dates and times.

LATE REGISTRATION

Late Registration continues one week (five days beginning and including the first day of classes) for the fall and spring semester and 2½ days for the summer session.

ADDING A COURSE

A student may add a course to his schedule during the first nine weeks of the semester with the approval of his academic advisor and instructor of the course. Forms for adding a course are available in the Registration Office.

DROPPING A COURSE OR CHANGING SECTIONS

A student shall be required to attend every course to which he is assigned and shall receive a grade at the end of the session unless the assignment has been properly cancelled. An assignment shall be cancelled at the Registrar's Office upon presentation by the student of a request approved by his academic advisor. When a course is cancelled during a semester before the end of the ninth full week (4½ weeks during summer session), no semester grade shall be recorded. No course shall be cancelled within the last four weeks of any semester (two weeks of any summer session), except for delinquency in attendance in which case the failing grades shall be recorded at the end of the session during the intervening time (between the end of the ninth week and the end of the twelfth week a course may be cancelled in the case of extenuating circumstances and upon the recommendation of the academic advisor and the instructor of the class). Cancellation will be without a semester grade if the student is passing. If he is not passing the student shall be assigned a grade of WF or WN by the instructor.

After the first five weeks of a semester a student may for serious delinquency be dropped from a course by the Committee for Scholastic Delinquency and Readmissions with the concurrence of the head of the department. In such cases the record shall show a grade of F. The chairman of the committee shall report this grade to the Registrar.

TRANSFER OF ENROLLMENT TO THE WEST LAFAYETTE CAMPUS

Upon the completion of any semester or summer session a regularly admitted student may transfer his enrollment from the Calumet Campus to the West Lafayette Campus or vice versa. To initiate this process the student must report to the registration office and complete the necessary forms. Following this procedure he will receive an Authorization for Enrollment form from the West Lafayette Campus along with instructions for registration. Only students attending on regular status may transfer to the West Lafayette Campus. Since all students who transfer also change schools, it is suggested that applications are completed early in the semester prior to the actual transfer.

A student who is regularly enrolled at the West Lafayette Campus for the academic year, but is attending summer classes at the Calumet Campus, does not need to file a transfer of enrollment to continue at the West Lafayette Campus for the following academic year.

STUDENT SERVICES

Counseling Center

The central focus of the University Counseling Center is on the growth of the individual student. The emphasis of the center is placed on working with the personal problems of students by helping each to learn and apply knowledge about himself in the total context of his daily living. To achieve this goal, the center offers assistance to students by providing the following counseling and testing services:

Counseling	**Testing**
Educational	Achievement
Group and individual	Aptitude
Marriage and family	Intelligence
Personal and adjustment	Interest
Social	Personality
Vocational	
Veterans Services	

Placement

The Placement Office at the Calumet Campus serves the students who are interested in either full-time or part-time employment. Orientation meetings are held at the beginning of the school year to acquaint all degree candidates with the services available to them from the Placement Office.

Prospective employers are encouraged to interview students at the campus prior to graduation. Undergraduates are assisted in finding part-time work and summer employment which bring needed revenue and often provide valuable experience. Alumni seeking positions may also avail themselves of the placement services.

To facilitate the job-seeking efforts of Calumet Campus students, the Educational Placement Office has been combined with the Placement Office which is located in the Student-Faculty Library Center. This centralized service

provides the student with job information and openings in the educational field, government service, and the world of business.

The Offices of the Dean of Students

The welfare of students is the primary concern of the Office of the Dean of Students. The Dean serves as a first and often as a last point of contact for students experiencing personal, family, academic or other kinds of problems. In addition to counseling and advising students in such matters, the Dean of Students answers questions and deals with issues involving University regulations, campus organizations, readmission to the University, discipline at the highest level, emergency loans, room reservations for student groups, financial matters for student organizations, freshman orientation and many other problem areas.

The Associate Dean of Students has the responsibility for student development and the coordination of student activities.

The collective energies of the people on the Dean of Students' staff are visibly engaged in the maintenance of quality involvement of student through productive experiences.

Student Activities

Student activities at Purdue University Calumet Campus offer a total way to get involved in interests that can go beyond or go along with academic life. Students have the opportunity to participate in a full range of thirty six student activities and organizations. Requests for new clubs are presented to the office of the Associate Dean of Students.

The GENERAL ASSEMBLY OF STUDENTS is concerned with student rights on campus, and members of the STUDENT ACTIVITIES BUREAU produce dances, movies, concerts, the carnival, Homecoming and many special events.

The staff of the NEXUS, the Purdue Calumet newspaper, express student opinion and present campus news. The ASTRON yearbook staff offers further involvement in the recording of campus life. The BLACK STUDENT UNION members enjoy activities and concerns of black students.

Purdue Calumet also has four fraternities and sororities, as well as special interest activities which include theater, music and religious organizations.

Athletics

In addition to the regularly scheduled physical education classes for men and women, a program of intramural sports and recreation is offered. Men's varsity teams compete intercollegiately in baseball, basketball, golf and soccer; the women's intercollegiate program includes badminton, tennis and volleyball.

AUTOMOBILE REGISTRATION AND PARKING

Because the Calumet Campus is essentially a commuter college, any registered student may use the parking facilities supplied by the University. All

students are required, however, to register each vehicle they intend to drive on University property with the Office of Safety and Security, to pay the appropriate fee, and to display the stickers which are issued. Strict observance of the regulations governing the registration of vehicles and the use of parking facilities is required to avoid congestion.

INSURANCE

Low cost University accident and health insurance similar to the policy offered at the West Lafayette Campus is offered annually to all students carrying an academic load of eight hours or more. Students may take advantage of the opportunity at the beginning of each semester.

CENTER FOR COMMUNITY SERVICES

Recognizing that public service is a traditional role of a university, Purdue University Calumet Campus is formulating plans for the establishment of a *Center for Community Services* to function as the extension and outreach arm of the Calumet Campus. The Urban Development Institute and Continuing Education are the major administrative units affiliated with the Center and narratives concerning those areas are presented in the paragraphs that follow.

The role played by the Center in Northwest Indiana will be guided by the goals which already have been established:

1. To contribute to the knowledge of urban life and apply this knowledge to society.
2. To help the University relate to urban society and help constituent communities in turn to relate to the University.
3. To help the State of Indiana and Region One (made up of Lake, Porter, LaPorte, Stark, Newton, Jasper and Pulaski Counties) and its communities deal with urban problems.
4. To coordinate the development and administer those University services designed to improve the quality of life in the Region through cultural, social and economic enrichment activities.
5. To serve as a catalyst for the development of interdisciplinary activities.
6. To serve as a consultant to agencies and organizations whose purposes and functions are consonant with the aims and objectives of the University.
7. To assist, encourage and coordinate the University's efforts in seeking resources for the development of programs of varying types.

Persons desiring further information about the programs and services offered through the Center may contact the Dean of Community Services.

CONTINUING EDUCATION

The Office of Continuing Education seeks to fill the need for continuing education for northwest Indiana citizens regardless of their previous contact with other educational institutions.

The Office of Continuing Education is that unit of the Center for Community Services through which many non-traditional credit and non-credit courses on and off campus are directed. It draws on the full resources of the University, working closely with the faculty and participating community groups to design new programs and services to meet the needs of the community served by the Calumet Campus.

Conferences, seminars, institutes and short courses are coordinated and arranged by the Office of Continuing Education for those who wish to continue their education by keeping informed in a variety of areas whether it be for self-enrichment or professional advancement. Members of the University faculty as well as resource personnel from the community offer instruction by lectures, discussion, demonstrations, case studies and field trips. Regular announcements regarding programs offered within the Continuing Education Program are made through the media and direct mailings to interested persons.

The University, through the Office of Continuing Education, cooperates with organizations or groups in planning, executing and evaluating conferences and seminars which will suit the needs of the sponsoring group. Those interested in inquiring about these services should contact the Office of Continuing Education, Purdue University Calumet Campus, Hammond, Indiana 46323 (telephone 219-844-0520, ext. 228 or 229).

URBAN DEVELOPMENT INSTITUTE

The Urban Development Institute is that arm of the University designed to deal with the complex of social problems and unprecedented social changes resulting from massive industrialization and rapid urbanization in the Northwest Indiana Metropolitan Region. In the land-grant university tradition of service to the community, the Institute is concerned with assisting citizens and facilitating other institutions and agencies to cope with these urgent urban problems by bringing academic resources to bear on their study, analysis and solution.

The Institute has been, and continues to be, concerned with the development of responsive local community leadership and the mobilization, training and general upgrading and expansion of local professional resources to work on state and federal governmental units, industries and voluntary agencies. It seeks to develop among the people of the region and their leadership a heightened awareness of the social economic political and cultural needs of the community. It seeks to develop greater understanding of the forces which hinder amelioration of unfavorable conditions and to set in motion long-range processes of planning leading to effective community action.

It also seeks to stimulate greater interest in urban problems on the part of relevant departments of the University and encourage them to participate in urban studies and urban research, particularly in an interdisciplinary context. The Institute provides an arena for consideration of these questions and seeks to provide opportunity for practical scholarly research in urban affairs.

The Institute, over the past decade, has concerned itself with problems such as family disorganization, community organization, intergovernmental relations, education of the disadvantaged, professional and para-professional training, community health planning and other health and welfare issues and has provided consultation to many regional agencies and organizations.

The Institute will continue to be concerned with many of these matters and will, as far as limited resources permit, extend its concerns to areas such as transportation, housing, youth opportunity, employment and other social and economic questions. Individuals and organizations sharing these concerns or interested in contributing to the solution of these problems may wish to consult with the Urban Development Institute about University involvement in these matters.

Fees

Fees are subject to change by the Board of Trustees without notice. All fees are payable at the time of registration each semester.

Schedule of Fees

Resident undergraduate	$21	per credit hour
Nonresident undergraduate	41	per credit hour
Resident graduate	26	per credit hour
Nonresident graduate	51	per credit hour
Laboratory fees	5	per lab hour
Registration for examination only	25	
Registration for degree only	25	

Estimated basic costs for two semesters for full-time undergraduate students:

	Indiana Residents	Nonresidents
University fees	$740	$1,680
Books and Supplies	100	100
Total	$840	$1,780

This total does not include the cost of transportation, housing, and meals.

Re-admission Fees. Those people who have been dropped by the University for academic reasons are assessed a $50 fee before their application for re-admission to the University will be processed.

Late Registration Fees. After classes begin a late registration fee will be assessed each registration at the rate of $5 per course and a $25 maximum always to apply.

Activity Fees. Undergraduate students enrolled in nine semester hours or more pay an activity fee of $10 per semester. This fee is optional for undergraduate students enrolled for fewer than nine hours and for all graduate students.

Athletic Fees. Undergraduate students enrolled in nine semester hours or more pay an Intercollegiate and Intramural Athletic Fee of $5 per semester. This fee is optional for undergraduate students enrolled for fewer than nine hours and for all graduate students.

Breakage Fees. Course fees include the cost of normal breakage and wear and tear on equipment. An additional charge will be levied against individuals for excessive waste, loss, or breakage that may occur. Such special charges must be paid before course credit will be given.

Parking Fees. Parking fees are based on the number of credit hours that a student registers for. The following schedule will prevail:

	Cost per Semester
Students enrolled in nine or more hours	$10
Students enrolled in eight hours or less	5

Graduation Fees. Bachelor's and master's degree, $10; Ph.D. degree, $15; payable before noon on the Friday preceding graduation or earlier by special announcement.

Candidates for associate degree, $10 payable not less than 30 days before the close of the semester in which they expect to complete the degree requirements.

Candidates for certificate programs, $5 payable not less than 30 days before the close of the semester or session in which they expect to complete the certificate requirements.

Service Fee. Students requesting duplicate copies of their schedule-receipt forms, etc. must pay a service fee of $1. Replacement copy of the permanent ID card will be two dollars. Replacement copy of the Activity-Athletic Pass will be one dollar.

Encumbrance Fee. If a student fails to fulfill any financial obligation to various University departments, his or her records will be encumbered and a five dollar fee will be assessed to the student by the department that issues the encumbrance. Prior to the assessment of the encumbrance fee the student will be advised in writing of the outstanding financial obligation and will be given a specified time to settle his or her account prior to the assessment of the fee.

If a student's records are encumbered because of outstanding financial obligation, he or she will not be allowed to register for an additional semester at Purdue University, nor will a student's transcript be released until his or her financial obligation and encumbrance fee are paid.

Refunds. Course fees (to include regular student fee, laboratory fee, and nonresident fee) will be refunded under any one of the following conditions:

1. Withdrawal during first week of semester, 100 percent refund.
2. Withdrawal during second week of semester, 60 percent refund.
3. Withdrawal during third week of semester, 40 percent refund.
4. Withdrawal during fourth week of semester, 20 percent refund.
5. Withdrawal after fourth week of semester, no refund.

A student who adds a class after the 100 percent refund period will be assessed as follows:

1. Dropped and added classes that result in an increased credit hour load are assessed for net credit hours increased, plus net lab hours increased.
2. Dropped and added classes that result in a decreased credit hour load are refunded for net credit hours decreased, plus net lab hours decreased, according to the refund schedule.

Students who must withdraw from the University to fulfill a military obligation should contact the Registration Office to ascertain the appropriate refund.

Deposits on equipment are subject to regular service and breakage charges.

Refunds are not transferable from one registration period to another or from one student to another. The same schedule will be applied to listener's, visitor's, and auditor's fees.

To be eligible for a refund, the student must notify in person his academic adviser and complete the necessary withdrawal procedures.

Withdrawal. In order to effect a withdrawal from any class, a student must notify his academic adviser at the time of withdrawal. Discontinuance of class attendance is not the basis for withdrawal, and students who do not notify the Registration Office when they plan to withdraw will be given a failing grade in each course involved.

CLASSIFICATION OF STUDENTS FOR TUITION PURPOSES

1. **General.** This regulation establishes the principles and procedures by which students shall be classified for tuition purposes at all campuses of Purdue University. Those classified as nonresident students are required to pay tuition fee in addition to the regular fees.

2. **Domicile.** As used herein, "domicile" means a person's true fixed and permanent home and place of habitation. The determination of a person's domicile involves a consideration of all revelant factors. Neither the ownership of property in Indiana, employment in Indiana, the payment of taxes, licenses, or other fees in Indiana, nor the registration as a voter in Indiana will necessarily be controlling in determining whether a person has established a domicile in Indiana for the purpose of this regulation.

3. **Married Students.** This regulation applies to married students as well as unmarried students. The marriage of a student is an additional factor to be considered in determining domicile for the purposes of this regulation. The domicile of a married woman shall be presumed to be that of her husband.

4. **Resident Students.** Resident students are not required to pay tuition. Resident students include the following:

   a. Students who are either 21 years of age or older or are emancipated and who have been domiciled in Indiana for at least six consecutive months immediately preceding the beginning date of the first session of attendance as either a beginning or re-entry student;

   b. Unemancipated minor students whose parents, legal guardian, or other person having legal custody, have been domiciled in Indiana for at least six consecutive months immediately preceding the beginning date of the first session of attendance as either a beginning or re-entry student;

   c. The spouse of a staff member so long as such staff member is eligible to pay staff fees;

   d. Alien students lawfully admitted to the United States for permanent residence and who are otherwise eligible for classification as resident students; and

e. Such other students as the president of Purdue University may approve for classification as resident students in unusual circumstances, consistent with general policies herein established.

5. **Nonresident Students.** All students not classified as resident students shall be required to pay tuition and shall be classified as nonresident students.

6. **Change from Nonresident to Resident Status.** A nonresident student may be reclassified by the registration officer to resident status if:

   a. He is an unmarried minor or is unmarried and over 21 years of age and is and always has been dependent upon his guardian or parent and if his legally responsible parent or guardian has moved into the state of Indiana and has maintained a domicile in the state for six-consecutive months.

   b. He becomes emancipated from his parents and providing he has maintained his domicile in the state of Indiana for not less than six consecutive months during which time he has provided his sole support through income which he has earned in the state of Indiana.

   c. He is a married student who, together with his spouse, is entirely dependent upon their own income; and providing such income is earned by them in the state of Indiana; and providing they have supported themselves and maintained their domicile in the state for a period of six consecutive months.

7. **Change from Resident to Nonresident Status.** A resident student will be classified by the registration officer to nonresident status if:

   a. He is an unmarried minor and his legally responsible parent or guardian has moved outside the state of Indiana and has maintained a domicile outside the state for six consecutive months.

   b. He is the spouse of a nonresident student no longer eligible to pay staff fees.

8. **Application for Change in Classification.** The initial classification of a student for tuition purposes shall continue in effect for all subsequent semesters unless and until such classification is changed. Changes may be initiated by the registration officer or applied for by the student and approved by the registration officer. No change shall be effective as to any semester unless it is made or approved by the registration officer within 60 days after the day on which classes begin for that semester. The registration officer shall not approve any application by a student for a change in tuition classification unless such application is made in writing on a form approved by the registration officer, and is filed with the registration officer on or before 15 days after the day on which classes begin for the semester for which the change is requested.

9. **Responsibility for Tuition Classification.**

   a. The admissions officer shall determine the tuition classification of each undergraduate student as of the time he enters the University.

   b. The registration officer shall determine the tuition classification of each graduate student and each re-entering student.

c. Any change of tuition classification of a student after initial registration shall be subject to the approval of the registration officer.

d. The classification of any student for tuition purposes may, on request of the student, be appealed to a Review Committee to be appointed by the president of the University. The decision of the Review Committee shall be final and binding upon the University and the student.

10. **Miscellaneous.**

a. The admissions officer, the registration officer, and the Review Committee are authorized to require such certificates, affidavits, documents, or other evidence as they deem necessary in the determination of facts relating to the classification of students for tuition purposes.

b. The misrepresentation of material facts or the failure to disclose material facts by any student, prospective student, or other person, in connection with tuition classification shall be grounds for the suspension or dismissal of the student in question.

Grading

ASSIGNING OF GRADES

Instructors will assign each student a grade for each course in which he is enrolled at the close of a session. The student shall be responsible for the completion of all required work by the time of the last scheduled meeting in the course unless his assignment to the course has been properly cancelled. The grade shall indicate the student's achievement with respect to the objectives of the course.

For credit courses:

A—highest passing grade.

B

C

D—lowest passing grade; passing minimal objectives of the course.

E—conditional failure; failure to achieve minimal objectives, but only to such limited extent that credit can be obtained by examination or otherwise without repeating the entire course. This grade represents failure in the course unless and until the record is duly changed within one semester. It cannot be changed to a grade higher than a D.

F—failure to achieve minimal objectives of the course. The student must repeat the course satisfactorily in order to establish credit in it.

For courses taken under the pass/not pass option:

P—passing grade; equivalent to grade of A, B, or C

N—Not passing

For zero credit courses (including thesis research but not including laboratory portions of courses in which, for purposes of scheduling, separate course

designations and separate class cards are used for the laboratory sections):

S—satisfactory; meets course objectives.

U—unsatisfactory; does not meet course objectives.

For incomplete work, either credit or noncredit:

O—incomplete; no grade; a temporary record of work which was interrupted by unavoidable absence or other causes beyond a student's control, and which work was passing at the time it was interrupted. An instructor may require the student to secure the recommendation of the Dean of Students that the circumstances warrant a grade if incomplete. On the record a grade of O will be equivalent to a W unless and until the record is duly changed within one semester.

PO—passing-incomplete; no grade; same as O except that student was enrolled under the pass/not pass option.

Directed grades. The registrar is directed to record the following grades and symbols under special circumstances:

W—Withdrew; a record of the fact that a student was enrolled in a course and withdrew or cancelled the course after the last date for late registration and adding courses.

WF—withdrew failing; a record of course cancellation after the last date for cancelling a course without grade, at which time, according to a statement from the instructor, the student was not passing in his work. This grade counts in all respects as a failing grade.

A grade of WF may be directed by the dean of men, the dean of women, or the Committee on Scholastic Delinquency and Re-admission when a student is dropped from a course for serious scholastic delinquency.

WN—withdrew not-passing; a record of cancellation of a course taken under the pass/not pass option. Otherwise the same as the WF except that it does not affect index computation.

GOOD STANDING

For purposes of reports and communications to other institutions and agencies and in the absence of any further qualification of the term, a student shall be considered in good standing unless he has been dismissed, suspended, or dropped from the University and has not been re-admitted.

SCHOLARSHIP INDEXES

The scholastic standing of all regular students enrolled in programs leading to an undergraduate degree shall be determined by two scholarship indexes, the semester index and the graduation index.

1. The semester index is an average determined by weighing each grade received during a given semester by the number of semester hours of credit in the course.

2. The graduation index is a weighted average of all grades received by a student while in the curriculum in which he is enrolled plus all other grades received in courses taken in other curricula offered by the University and properly accepted for satisfying the requirements of the curriculum of the school in which the student is enrolled. With the consent of his adviser, a student may repeat a course. In the case of courses which have been repeated or in which conditional grades have been removed by examination or for which a substantially equivalent course has been substituted, the most recent grade received shall be used. A minimum graduation index of 4.00 is required for graduation.
3. For the purpose of averaging, each grade shall be weighted in the following manner:

A—6 x semester hours = index points
B—5 x semester hours = index points
C—4 x semester hours = index points
D—3 x semester hours = index points
E, F, WF-2 x semester hours = index points
P, N, O, PO, W, WN not included

Graduation Index Requirement

For the bachelor's degree: the required minimum graduation index is 4.00. For the associate degree: the required minimum graduation index is 3.90.

SCHOLASTIC PROBATION

A candidate for the bachelor's or associate degree shall be placed on probation if his semester or graduation index at the end of any semester is less than that required for a student with his classification as shown in Table A. A student on probation shall be removed from that status at the end of the first subsequent semester in which he achieves semester and graduation indexes equal to or greater than those required for a student with his classification as shown in Table A. Any grade change due to a reporting error will require reconsideration of probation status.

Temporary students who do not achieve academic standing required of regular students may be discontinued. Probation is concerned only with the regular semesters and not with the summer sessions and intensive courses.

TABLE A. INDEX LEVELS FOR PROBATION

S = Semester Index; G = Graduation Index

Classification	S	G
1	3.5	3.5
2	3.5	3.5
3	3.6	3.75
4	3.6	3.90
5	3.7	3.95
6	3.7	4.0
7	3.7	4.0
8 and up	3.7	4.0

DROPPING OF STUDENTS FOR SCHOLASTIC DEFICIENCY

A student on scholastic probation shall be dropped from the University if at the close of any semester the semester or graduation index is less than that required of a student with his classification as shown in Table B. This rule shall not apply for the semester in which the student completes all requirements for his degree. A student dropped by this rule and later duly re-admitted as a regular student shall be re-admitted on probation.

TABLE B. INDEX LEVELS FOR DROPPING

S = Semester Index; G = Graduation Index

Classification	S	G
1	3.2	3.2
2	3.3	3.3
3	3.4	3.5
4	3.4	3.6
5	3.5	3.7
6	3.5	3.8
7	3.5	3.85
8 and up	3.5	3.9

REQUIREMENTS FOR GRADUATION

To gain a baccalaureate degree from Purdue University, a student shall satisfy the following requirements:

1. The completion—either by resident course work by examination, or by credit accepted from another institution—of the plan of study underlying the degree. Deans of schools may refuse to accept as credit toward graduation any course which was completed ten or more years previously. Former students shall be notified immediately of all such decisions upon re-entering. Substitutions of courses required for graduation may be made by the dean of the school in which the student is registered.
2. Resident study at Purdue University for at least two semesters and the completion during this period of at least 32 semester hours of work in courses regularly open to third- or fourth-year students. Students are normally expected to complete the senior year in residence: however, with the approval of the dean of the school concerned, students who have had at least four semesters of resident study may complete not to exceed 20 semester hours of the senior year in another approved college or university. For the purpose of this rule, two summer sessions shall be considered as equivalent to one semester.
3. Registration, either in residence or in absentia, as a candidate for the desired degree during the semester (or summer session) immediately preceding its conferment.
4. A minimum graduation index of 4.00 shall be required for graduation. A student who has completed all other requirements for a bachelor's degree but has failed to meet the quality requirements may register for additional courses with the approval of an authorized representative of the dean of his school after a review of his record. The additional

courses which the student may take after meeting all quantity requirements shall not exceed twenty credit hours. Such a student may take in another approved college or university not more than nine of the twenty credit hours permitted, provided such courses are approved in advance in writing by an authorized representative of the dean of his school. A copy of such approval must be filed in the Office of the Registrar. Credit in these additional courses must be established within five years of the date on which all degree requirements except the minimum graduation index were met. The student will be considered as having met the quality requirement for graduation if his graduation index, including the above extra courses, meets the quality standard in effect at the time when all other graduation requirements were satisfied.

5. The payment of the graduation fee to the bursar on such date as may be specified preceding the end of the session.
6. The demonstration of satisfactory working knowledge of the English language with particular reference to composition and spelling. Junior and senior students who are markedly deficient in English shall be reported to the Registrar by the Committee on Standards in English. They shall then be assigned to a noncredit course, which they will be required to pass before graduation.

To gain an associate degree from Purdue University a student shall satisfy the following requirements:

1. The completion, either by resident course work, by examination, or by credit accepted from another institution, of the plan of study underlying the degree. Deans of schools may refuse to accept as credit toward graduation any course which was completed ten or more years previously. Former students shall be notified immediately of all such decisions upon reentering. Substitutions of courses required for graduation may be made by the dean of the school in which the student is registered.
2. Resident study at Purdue University for at least two semesters and the completion during this period of at least 32 semester hours of work in courses regularly open to first or second year students. Students are normally expected to complete the entire second year in residence; however, with the approval of the dean of the school concerned, students who have at least three semesters of resident study may complete not to exceed sixteen semester hours of the second year in another approved college or university. For the purpose of this rule, two summer sessions may be considered as equivalent to one semester.
3. Registration, either in residence or in absentia, as a candidate for the desired degree during the semester (or summer session) immediately preceding its conferment.
4. A minimum graduation index of 3.90 shall be required for graduation. A student who has completed all other requirements for an associate degree but has failed to meet the quality requirements may register for additional courses with the approval of an authorized representative of the dean of his school after a review of his record. The additional courses which the student may take after meeting all quantity requirements shall not exceed ten credit hours. Credit in these additional courses must be established within three years of the date on which all

degree requirements except the minimum graduation index were met. The student will be considered as having met the quality requirement for graduation if his graduation index, including the above extra courses, meets the quality standard in effect at the time when all other graduation requirements were satisfied.

5. The payment of the graduation fee to the bursar on such date as may be specified preceding the end of the session.

DISTINGUISHED STUDENTS

At the conclusion of each semester, the registrar shall indicate which regular undergraduate students were distinguished in their scholastic work as indicated by the grades they received at the close of the semester. Suitable publicity shall be given to the names of these students. To be cited as a distinguished student in any semester, one must:

1. Complete successfully all the courses to which he was assigned, with a grade of C, P, or better, except any that may have been cancelled without a semester grade.
2. Have completed at least 14 semester hours.
3. Attain a semester scholarship index of at least 5.50 (credit hours earned with a grade of P or Pass will not be used in determining the semester scholarship index, but will be counted as part of the minimum 14 hours required.)

Those placed on the list of distinguished students, published after the close of each semester, are entitled to special privileges as follows:

Honor students of all classes are offered the opportunity to do, for credit toward graduation, work in addition to their regular schedule of studies. These additional assignments must have the approval of the head of the school involved. In order to make such additional work practicable the following special concessions may be granted:

1. Regular assignment of such additional subjects as the schedule will permit.
2. Assignments outside class under the supervision of an instructor.
3. Opportunities to gain credit in a subject by special examination.
4. Special arrangements as approved by the head of the school involved.
5. Some flexibility in the application of the system of prerequisites to these students.

Detailed reports of special arrangements under numbers 2 and 4 are to be filed by the instructor with the dean of the school involved, with a recommendation concerning the amount of credit to be granted.

Students who in the judgment of one or more faculty members merit citation for special distinguished achievement shall have their names presented through the heads of instructional departments or directly to the Committee on Students of Superior Ability, together with such evidence of achievement as is available. The criteria for selecting students in this group are: (1) original thinking of consistently good quality: (2) achievement other than class work—publication of literary, artistic, or scientific work; (3) work which requires great

ingenuity or industry, but which may not lead to definite publication; and (4) independent projects of reasonable magnitude carried out by the student on his own initiative.

Projects carried out by such students may receive special achievement credit. Students in this group are not eligible for the special privileges listed above for distinguished students.

ACADEMIC HONORS LIST

An academic honors list of full-time students with high academic rank is prepared each semester and certificates awarded to those students so listed. The requirements for inclusion are a semester index 5.25 or higher, 12 hours or more completed, and no grade less than C or P. In addition, at the conclusion of the spring semester, special recognition is given to an outstanding student from each of the Calumet Campus schools.

DEGREES WITH DISTINCTION

Degrees are awarded at the end of each semester and summer session to candidates who have completed the requirements of their schools. At each of these periods degrees with distinction are awarded to those completing the undergraduate plans of study under the following rules:

1. Distinction at graduation shall be awarded on the basis of all course work taken for letter grades at Purdue University. Baccalaureate degrees with distinction shall be granted to persons who complete at least three years at Purdue University, complete all the requirements for the major in their area, and meet the requirements of paragraphs 2 through 5 below. Those persons qualifying after three years must be in programs approved for exception.
2. A candidate for the baccalaureate degree with distinction must have earned at least seventy hours of credit at Purdue. A candidate for an associate degree with distinction must have earned at least forty-five hours of credit at Purdue.
3. For any student to qualify for distinction, his scholastic index for all work completed must be at least 5.00.
4. If the number of graduates in any school who qualify for distinction under rules (1) through (3) exceeds one-tenth of the total number of graduates from that school for that semester or summer session, the number of degrees with distinction shall be limited to one-tenth of the class in that school, and those graduates with highest indexes shall be included. In administering this rule, all baccalaureate engineering graduates will be considered as one school and all associate degree graduates will be considered as one school.
5. Of those students who qualify for distinction under these rules, the three-tenths of the baccalaureate graduates having the highest indexes shall be designated as graduating with highest distinction, irrespective of the schools to which they may belong. The three-tenths of the associate degree graduates having the highest indexes will be designated as graduating with highest distinction.

Graduate Study

Graduate programs at Purdue University Calumet Campus provide qualified students the opportunity to complete most and in some cases all requirements for a master's degree. Since graduate programs at Calumet Campus operate under the supervision of West Lafayette Campus departments, individual Calumet graduate courses supply credit according to qualifications established for the entire University. Only courses approved by a student's advisory committee and by the dean of the Graduate School may form the plan of study for the master's degree.

ADMISSION

Regular (Degree-Seeking) Graduate Students

Applicants for regular admission may apply through the Graduate School Office at the Calumet Campus. Applications will then be considered by the Graduate School, by the department at the West Lafayette Campus which administers the graduate degree program, and by the Calumet Campus department that will provide the program. Applicants should submit official transcripts and any other documents a department may require (see the Graduate School Bulletin). Applicants should show promise of ability and hold a baccalaureate degree from an accredited institution. After admission, degree candidates must follow a formal plan of study (see Advisory Committee and Plan of Study sections below).

Nondegree (Temporary) Graduate Students

Persons who wish to register for individual graduate courses should apply for temporary admission at the Graduate Office, Calumet Campus. Nondegree graduate students may later become regular graduate students by completing the degree candidate application and securing regular admission to the Graduate School as indicated above. However, such applicants can apply toward a Purdue advanced degree program no more than nine semester hours of credit earned while a temporary student. Credits earned as a temporary graduate student will have no effect upon the applicant's admission as a regular graduate student.

Graduate Record Examination

Among those who apply for regular admission to the Graduate School, any applicant in one or more of the following categories must take the Aptitude Test Section of the Graduate Record Examination (GRE):

1. Those who hold a baccalaureate degree from a nonaccredited institution;
2. Those who feel their previous academic record does not adequately reflect their ability;
3. Those who are applying for admission to a department with such a requirement; for example, the Department of History requires that all applicants take the aptitude section of the GRE;
4. Those who are to be considered for an assistantship or fellowship appointment.

The Educational Testing Service, Box 955, Princeton, New Jersey 08540, can advise applicants of testing dates and locations, as does the Graduate School calendar.

Currently the GRE examination is being given at the Calumet Campus twice a year, during spring and fall semesters. Contact the Calumet Campus Graduate Office, Room X-170C, for applications and further information.

GENERAL REGULATIONS

Standards of Work

Only grades of C or above are acceptable in the Graduate School, including prerequisite courses. The same scholastic requirements which are in effect during the regular academic year are applicable in the summer session. A department or a candidate's advisory committee may require higher performance than a grade of C. Pass/not pass grades are not acceptable. Each semester the major department and the dean of the Graduate School will review each student's progress, and unsatisfactory performance may lead to dismissal from the Graduate School.

English Requirement

A regular graduate student may not ask for the appointment of an advisory committee or file a plan of study until he has met the English proficiency requirement or has taken steps to meet it. Students whose native language is English satisfy the English requirement if they (1) received no grade below B in undergraduate composition courses or (2) received a scaled score of at least 600 on the verbal aptitude section of the Graduate Record Examination, or at least 36 on the verbal portion of the Admission Test for Graduate Students in Business. Regular graduate students who fail to meet these criteria must satisfy the requirement without delay by writing an acceptable test paper for the Committee on Standards in English.

Foreign Language Requirement

The Graduate School has no general foreign language requirement for the master's degree. Some departments, however, do require a reading knowledge of a foreign language. Normally, the required foreign language will be pertinent to the field of study, since the principal purpose is that the language should serve as a research tool.

Undergraduate and Transfer Credit

Students may apply credits earned beyond the baccalaureate degree at Purdue or elsewhere toward an advanced degree. The schools and departments of the University determine the conditions of such credit transfer, except that no credit transfer can be allowed toward the master's degree before a student completes one semester of satisfactory work at Purdue.

Advisory Committee

Each regular graduate student must have an advisory committee, usually consisting of three members, to assist him in preparing his plan of study, to advise him during his graduate work, and, in the case of the thesis option,

to advise him in his thesis research and writing. To chair this committee the student selects, with approval of the head of the major school or department, his major professor, who will also supervise the candidate's program. The relationship of student and major professor must be mutually acceptable. Together, they must agree on related areas of study, from each of which they choose one professor to serve on the advisory committee, adding other members if advisable. With the exception of the chairman, committee members need not be professors with whom the student has taken, or will take, course work. After its formation, the advisory committee, as approved by the heads of the departments of the primary and related areas of study, must be presented for formal approval by the dean of the Graduate School, who may appoint additional members if advisable.

Plan of Study

The student's plan of study includes a primary area and a related area, or areas, chosen on the basis of his interests and needs. During his first semester of graduate work, the student and his adviser should arrange a tentative plan of study. Before his final semester the student must submit a formal plan of study, approved by his advisory committee and the head of the major school or department, to the dean of the Graduate School. The formal plan must include the specific courses the student expects to complete and all other requirements of his master's degree program, with semester-hour requirements and course acceptability determined by the appropriate department or administrative unit.

Admission to Candidacy

Admission to candidacy for the master's degree is granted only after approval of the formal plan of study. A candidate for any advanced degree must be registered during the semester in which the degree is to be awarded. The diploma fee must be paid before noon on the Friday preceding graduation, or earlier by special announcement.

Oral and Written Examinations

The Graduate School has no general requirements for oral or written examinations for the master's degree. These are established by the advisory committee or the department. A final examining committee appointed for each candidate must certify to the Graduate School that the student has met the requirements of his major department.

Additional Information

Consult the Graduate School bulletin for further information concerning regulations and descriptions of courses.

PRINCIPAL AREAS OF GRADUATE STUDY

The University has approved the following master's degree programs for Calumet Campus:

1. Master of Arts in Teaching (major in mathematics)
2. Master of Arts (major in English)
3. Master of Arts (major in English, option for teachers)

4. Master of Arts (major in American or European history)
5. Master of Science in Engineering
6. Master of Science (major in mathematics, option for teachers)
7. Master of Science in Education in:
   a. Administration
   b. Educational media
   c. Elementary education
   d. Guidance and counseling
   e. Secondary education with majors in biology, educational media, English, history, industrial education, mathematics, political science, communication, and modern languages.
8. Master of Science in Industrial Management

Complete programs available at the Calumet Campus are those for the Master of Arts in Teaching (major in mathematics), the Master of Arts (major in English), Master of Arts (major in English, option for teachers), Master of Arts (major in American or European history), Master of Science in Education, Master of Science in Engineering, Master of Science (major in mathematics, option for teachers), and Master of Science in Industrial Management. In addition, the Calumet Campus offers portions of other graduate programs. The Calumet Graduate Office can provide further information on all campus graduate programs. Descriptions of various master's degree programs may also be found in the Purdue University Graduate School bulletin.

GRADUATE PROGRAMS IN EDUCATION

The Master of Science degree in Education is designed to provide the graduate student an opportunity to broaden and strengthen his academic background as well as to increase his professional competence.

A plan of study includes advanced professional courses in areas of particular interest plus educational foundation courses in such areas as psychology, sociology, philosophy and history. Each program is individually planned in keeping with the student's certification requirements and professional interests.

Elementary Education

The program provides opportunities to pursue areas of special interest related to elementary education. This plan would allow related study in such professional areas as remedial reading, guidance, educational media, special education, or supervision, as well as in an academic area of importance to elementary teachers.

Secondary Education

The graduate program would include, in addition to the foundation courses required of all master degree candidates, electives relating to the student's educational objectives. In addition, conversion of the initial provisional teaching certificate requires that the master's degree include a minimum of eight semester hours in each of the candidate's teaching areas for which he desires professional certification. If only one teaching area is maintained, 15 semester hours are recommended.

Educational Administration

The master's degree in educational administration includes the basic courses in administration and supervision as well as electives selected from such areas as school law, school finance, and school buildings and grounds. Such a program would concentrate courses in either elementary school administration or secondary school administration. The program is designed to prepare the candidate for a school principalship or related administrative positions and meets the academic requirements for the Indiana School Administrator and Supervisor Certificate, Provisional. Programs leading to the professionalization of the provisional certificate can be followed at the Calumet Campus as courses are available.

Educational Media

The master's degree program in educational media prepares the student for positions as educational media specialists, as librarians in elementary or secondary schools, as material center specialists, and/or audio-visual coordinators. The educational media program is designed to meet the state of Indiana's certification requirements in school library and audio-visual services. The program involves a variety of options ranging from radio and television courses, computer technology, preparation of instructional materials, and individualized instruction.

Counseling and Personnel Services

Students who complete the graduate program in counseling and guidance will be qualified for positions as counselors and student personnel workers. Graduates will also qualify for the Indiana School Services Personnel Certificate, Provisional. The plan of study includes the educational foundation courses and required sequence in psychological measurement. Courses in the major sequence provide concentration in guidance and counseling theory and principles, career theory and informational services, counseling techniques, and practicum. Specialized areas of study include elementary or secondary school counseling and guidance, college student personnel services, and community counseling. Programs leading to the professionalization of the provisional certificate can be followed at the Calumet Campus as courses are available.

GRADUATE PROGRAM IN ENGINEERING

A special graduate program is offered in the Department of Engineering at Purdue University Calumet Campus leading to a degree of Master of Science in Engineering.

The Committee on Continuing Education in Engineering (CCEE) is responsible for the over-all administration of the Interdisciplinary Graduate Program in Engineering.

Nature and Purpose of Program

This graduate program in Engineering involves an interdisciplinary approach in education with emphasis placed on the basic engineering sciences. It is designed to meet the specific needs of engineers employed in industry throughout the state of Indiana. The program has enough flexibility so that the student may elect to take courses in several engineering disciplines or elect

strong options in a few disciplines. The recommended maximum load for any student who is fully employed is one course per semester.

General Degree Information

This interdisciplinary program leads to either the degree of Master of Science or the degree of Master of Science in Engineering. Students in this program must qualify as regular students and satisfy all the admission requirements of Purdue University. Both thesis and non-thesis programs can be arranged. The non-thesis program requires a minimum of 33 semester hours of course work, and the thesis program requires a minimum of 24 semester hours of course work in addition to a project and thesis.

Admission as a regular student

A student who wishes to enter a program leading toward the degree of Master of Science or Master of Science in Engineering must apply for admission as a *regular student* and should hold a baccalaureate degree. Under special circumstances a student without a baccalaureate degree in engineering will be considered if he has completed the equivalent of studies required for a baccalaureate degree at Purdue.

Students having a Bachelor of Science in Engineering from an accredited institution will work toward the Master of Science in Engineering degree. Students with a Bachelor of Science in fields other than engineering or with a Bachelor of Science in Engineering from a non-accredited institution will work toward the Master of Science degree, unless granted special permission by the CCEE to work toward a Master of Science in Engineering degree. The student's undergraduate graduation index (grade point average) must meet or exceed 4.8/6.0 or equivalent as shown on his official transcript. In special cases a temporary or conditional admission can be granted.

Advisory committee

For each prospective candidate for the Master of Science in Engineering degree there shall be an advisory committee consisting of a minimum of three faculty members. The duties of this committee are to assist the student in the preparation of his plan of study and to advise him during his period of graduate work. In the case of thesis option, the committee also advises the student regarding his research and the writing of his thesis. All students will consult with an advisor on the regional campus. Normally, this will be the engineering department head or his designate. The student, with the approval of the department head, shall select his major professor. The major professortudent relationship must be a mutually acceptable one. When selected, the major professor will act as the chairman of the student's advisory committee and, where applicable, be in charge of his research. The major professor and the student shall agree upon the related areas and choose at least one additional professor to serve with the major professor to represent the related area or areas. The third advisory committee member will be the graduate advisor at the Lafayette campus. Other members may also be added to the advisory committee. The advisory committee, as agreed upon by the major professor and the student, with the approval of the engineering department head and the chairman of the CCEE, shall be presented to the dean of the Graduate School for his approval and final appointment.

Plan of study

The plan shall be appropriate to meet the needs of the student in his/her chosen field as determined by his advisory committee. It shall include the specific courses the student is expected to complete and all other requirements of the degree.

In either a thesis or a non-thesis program, a plan of study consists of a group of courses in the student's "Primary Area" and other courses in a "Related Area" or "Related Areas". The courses in the Primary Area should form a coherent group with all showing reasonably close relationship. Courses in the Related Area or Areas are less closely related to the Primary Area but still contribute to the program. Normally, courses in Mathematics will be included on the plan of study. Courses may be selected from any academic area. In general, all courses will be graduate level (500 or 600 numbers).

A tentative plan of study should be drawn up early in the student's program in consultation with his advisor or his major professor. Courses on the tentative plan of study should be sent to the graduate advisor at the Lafayette campus for review.

The final formal plan of study should be submitted to the chairman of the CCEE as soon as possible, but not later than the next to the last term in which the student is to become a candidate for a degree. This should occur prior to the student's last semester. The formal plan of study is subject to the approval of the advisory committee, the chairman of the CCEE, and the dean of the Graduate School.

Graduate Courses, Primary and Related Areas

For a detailed description of these courses see the appropriate departmental sections of the catalog.

PRIMARY AREA

Department and Course Number		Course Title
A&AE	547	Experimental Stress Analysis
CE	570	Advanced Structural Mechanics
CE	573	Basic Vibrations
EE	583	Introduction to Automatic Control Systems
EE	600	Random Variables & Signals
EE	602	Lumped System Theory
EE	604	Electromagnetic Field Theory
EE	606	Solid State & Magnetic Devices
EE	654	Semiconductor Devices
EE	672	Linear Passive Network Theory
EE	676	Linear Active Network Theory
EE	680	Introduction to Modern Control Theory
EE	685	Dig Proc Contr Math Model of Indst Systems
ME	500	Thermodynamics
ME	505	Heat & Mass Transfer
ME	509	Intermediate Fluid Mechanics
ME	510	Gas Dynamics
ME	513	Engineering Accoustics
ME	528	Air Pollution

PRIMARY AREA—Continued

Department and Course Number		
ME	560	Kinematics
ME	563	Mechanical Vibration
ME	569	Mechanical Behavior of Materials
ME	580	Nonlinear Systems
ME	614	Advanced Gas Dynamics
ME	652	Rocket Jet Propulsion
ME	660	Advanced Kinematics
ME	663	Advanced Mechanical Vibrations A.
ME	664	Advanced Mechanical Vibrations B.
MSE	576	Corrosion
MSE	597A	The Physical Chemistry of Iron and Steel Production
MSE	597B	Phase Transformations and Physical Properties
MSE	597C	Mechanical Behavior of Materials
NUCL	501	Nuclear Engineering Principles
NUCL	502	Nuclear Engineering Systems
NUCL	510	Nuclear Reactor Theory
NUCL	520	Radiation Effects and Reactor Materials

RELATED AREA

CS	514	Numerical Analysis
CS	515	Numerical Analysis of Linear Systems
IE	530	Quality Control
IE	590H	Health Systems Engineering
MA	501	Techniques of Applied Mathematics I
MA	502	Techniques of Applied Mathematics II
MA	510	Advanced Calculus
MA	520	Boundary Value Problems of Differential Equations
MA	525	Introduction to Complex Analysis
PHYS	545	Solid State Physics
PHYS	550	Introduction to Quantum Mechanics
PHYS	556	Introductory Nuclear Physics
STAT	511	Statistical Methods I
STAT	512	Statistical Methods II
STAT	516	Basic Probability and Applications

GRADUATE PROGRAMS IN ENGLISH

Master of Arts in English (Teaching Option) Degree Program

This program has been designed for teachers of English in grades 7-12 who need a master's degree for professional certification. There is no foreign language requirement. The program provides for a strong subject matter concentration and includes course work in English and American literature, linguistics, literary criticism, and methodology. It is offered complete at the Calumet Campus.

Requirements

1. The course requirement is 33 semester hours of class work. There is no thesis option.

2. Students must be regularly admitted to the Purdue University Graduate School and follow a plan of study approved by their faculty advisers and by the dean of the Graduate School.
3. There is no foreign language requirement.
4. Each student not otherwise qualified will complete (as specified in his individual plan of study):
   a. A course in methods of literary study (such as English 601).
   b. English 691, a course in the methodologies of teaching.
   c. Two graduate courses in linguistics, chosen with the advice of the student's advisory committee.
   d. At least one and not more than three courses in each of the following areas:
      (1) English literature before 1660 (including a course in Shakespeare if not previously taken and at the level indicated under 5.)
      (2) English literature from 1660 to 1783.
      (3) English literature from 1783 to present.
      (4) American literature.
5. Students who have satisfactorily met any of the above requirements (in whole or in part) on the undergraduate level at Purdue University or elsewhere in senior, dual or graduate courses may substitute up to nine hours of work from (1) other English courses, including as many as three from the numbered areas in 4 above; (2) from other disciplines (especially for second subject endorsements); and (3) from education with the approval of the Graduate Committee.
6. All students will write four final examinations:
   a. A one-hour examination on the methodolgies of teaching.
   b. A one-hour examination on the English language.
   c. A two-hour examination on either English literature before 1660 or English literature from 1660 to 1783.
   d. A two-hour examination on either English literature from 1783 to present or American literature.

Master of Arts in English (Regular Option) Degree Program

This program offers course work in English, American, and modern literature, in the study of language and linguistics, and in literary criticism. It is planned to meet the needs of teachers of English in high schools and colleges, of students planning to undertake further course work beyond the master's degree, and of others for whose career purposes a master's degree in English will be useful. All course work may be accomplished at the Calumet Campus.

Requirements

1. The course requirement is 30 semester hours of class work. The thesis option, when available (special permission is required), requires 21 semester hours of class work.
2. All students are required to demonstrate a reading knowledge of one foreign language (normally French, German, or Spanish).

3. All students are to complete a course in basic methods of literary scholarship and literary criticism. English 601, Methods of Literary Study, satisfies this requirement.
4. All students are to complete at least one graduate-level linguistics course.
5. Each student, preferably in the last semester of course work, will take at least one 600-level seminar.
6. Those who have satisfactorily met some or all of the above requirements on the undergraduate level or at the graduate level here or at other institutions will not have to repeat them here when approved by the department head or his designate.
7. In addition to satisfying the other requirements, all candidates for the M.A. in English will take a four-hour comprehensive examination based on a published list of 12 pairs of important works in English and American literature. The student will be permitted to choose the 12 works (one from each pair) on which he will be examined. If he wishes, he may substitute a linguistics question for one of the literary questions on the examination.
8. Students may choose a linguistics option, for which a still more substantial part of the final examination will be in the area of linguistics.

Some 35 different graduate English courses, offered recurrently at the Calumet Campus for these two programs, allow students a considerable range of choice.

Applicants may request an appointment with a graduate English counselor by calling the Graduate School Office or the English Office.

GRADUATE PROGRAM IN HISTORY

The Calumet Campus offers complete Master of Arts programs in American and European history. The student may select his courses to develop his cultural interest, improve his teaching skills, or prepare himself for further graduate work.

Requirements for Admission

The applicant must be a graduate of an accredited college or university, complete the Aptitude Section of the Graduate Record Examination, and submit transcripts of previous work and letters of recommendation.

Program Requirements

The Master of Arts in History calls for 33 hours of course work, including at least three seminars in history, and History 582 or its equivalent. A maximum of six hours may be transferred from another university. There are no language requirements. Written final comprehensive examinations will review the student's knowledge of his areas of concentration.

Students may specialize in either American or European history or may combine both into a major and related area. A major in either area may be combined with related disciplines such as English or education.

For specific information and application forms contact either the Section of History or the Graduate School Office. Completed applications should be given to Prof. Saul Lerner, head, Department of History and Political Science.

Graduate Courses

The following history courses are available at Calumet Campus on a one- or two-year cycle. Most are offered on both day and night schedules to accommodate full- or part-time students:

Course No. Course Title

HIST 403—Europe in the Reformation
HIST 461—The Revolutionary Era, 1763-1800
HIST 472—Mexico
HIST 493—Interdisciplinary Undergraduate Seminar
HIST 494—Science and Technology in American Civilization
HIST 496—History and the Life Sciences
HIST 510—Age of Absolute Monarchy, 1600-1689
HIST 511—England Under the Tudors
HIST 512—England Under the Stuarts
HIST 513—Modern Europe, 1789-1850
HIST 514—History of Western Thought I
HIST 515—History of Western Thought II
HIST 521—Problems in History of Great Britain—19th Century
HIST 522—Problems in History of Great Britain—20th Century
HIST 525—Problems in 20th Century German History
HIST 528—European International Relations and Power Politics, 1648-1815
HIST 529—European International Relations and Power Politics, Since 1815
HIST 535—Modern Europe, 1850-1914
HIST 538—Modern Russia
HIST 552—Modern Europe, Since 1914
HIST 553—Colonial America, 1600-1776
HIST 554—Era of Sectionalism, 1820-1856
HIST 555—Emergence of Modern America, 1865-1916
HIST 564—Modern America, 1917-Present
HIST 569—American South
HIST 570—United States-Latin American Relations
HIST 575—American Frontier
HIST 577—Contemporary Latin America
HIST 578—Colonial Latin America
HIST 579—National Latin America
HIST 582—Art of History
HIST 584—Social History of United States
HIST 585—American Labor History
HIST 586—United States Foreign Affairs to 1900
HIST 587—20th Century United States Foreign Affairs
HIST 589—History of Religion in America
HIST 590—Modern Germany
HIST 591—Directed Reading in History
HIST 592—Early American Intellectual History
HIST 593—20th Century American Intellectual History
HIST 596—The American City
HIST 597—Problems in 20th Century Black America
HIST 599—Teaching Black History
HIST 601—Reading Seminar in European History

Course No.	Course Title
HIST 603	Seminar in European History, Renaissance and Reformation
HIST 605	Seminar in European History, The Ages of Absolutism, Enlightenment, and Reason
HIST 607	Seminar in European History, French Revolution and 19th Century
HIST 609	Seminar in European History in the 20th Century
HIST 611	Seminar in the Political and Constitutional History of Europe
HIST 651	Reading Seminar in American History
HIST 653	Seminar in American History, Colonial History and the American Revolution
HIST 655	Seminar in American History, National Period to 1850
HIST 657	Seminar in American History, 1850 to World War I
HIST 659	Seminar in American History, World War I to Present
HIST 661	Seminar in United States Foreign Affairs and National Security Policy

GRADUATE PROGRAM IN INDUSTRIAL MANAGEMENT

The Department of Administrative Science Calumet Campus and the Graduate School of Industrial Administration offers graduate work leading to a Master of Science degree with a major in Industrial Management. Graduate courses are offered in the evening hours so that the degree can be completed exclusively at night.

OBJECTIVES: The objective of the program is to help students prepare for positions of major responsibility in American industry. The program is designed to help those with undergraduate training in engineering, mathematics, science, humanities or business.

The curriculum provides an opportunity for the student to gain an understanding and develop some useful managerial skills in each of the major functional areas of industrial management. One of the major purposes of each course is to help each student acquire increased managerial competence and breadth in administrative decision-making.

ADMISSION REQUIREMENTS: Candidates are expected to have a bachelor's degree from an accredited college or university. In addition, all applicants must write the Admission Test for Graduate Study in Business. Students whose native language is not English must also take the TOEFL examination.

In evaluating applications, the school is concerned primarily with an individual's capacity for management responsibility. Demonstration of intellectual capacity is a prime consideration; however, close attention also is given to indications of personal development which may have a bearing on the individual's prospects for career success in industry. The evaluation is based upon a detailed review of the written application, academic transcripts, letters of evaluation from former instructors and others who are qualified to evaluate the applicant's capacity for graduate study, and the score on the Admission Test for Graduate Study in Business.

REQUIREMENTS FOR A DEGREE: A student must complete 42 hours of course work as outlined below. There is no thesis requirement. Students who feel that their circumstances require deviations from the outlined program

should discuss their proposed plan of study with their graduate advisor. It is anticipated that most students will satisfy the calculus requirement by prior undergraduate work. University regulations require that at least 30 hours must be taken in residence at Purdue and that a B (5.0/6.0) average must be maintained in order to qualify for the degree. There is no foreign language requirement, but basic English proficiency must be demonstrated by previous college credit or by examination.

The Master of Science in Industrial Management Program Consists of the Following:

Core Requirement I	
Differential and integral calculus	6 hours
Quantitative Methods IM 670, IM 671, IM 672	6 hours
Core Requirement II	
Managerial Accounting, IM 600, IM 601	6 hours
Financial Management IM 611	3 hours
Marketing Plans and Decision Making IM 620	3 hours
Production Management IM 660	3 hours
Core Requirement III	
Behavioral Science and Industrial Relations IM 631	3 hours
Core Requirement IV	
Economics EC 513	3 hours
Core Requirement V	
Business Policy IM 651 or	
Small Business Management IM 583	3 hours
Core Requirement VI	
Legal and Social Environment of Business IM 630	3 hours
Electives:	
Labor Law IM 553	
Seminar in Managerial Finance I IM 614; II IM 615	
Seminar in Investments IM 616	
Collective Bargaining IM 632	
Government and Industrial Relations IM 636	
Operations Management II IM 661	3 hours
Total Semester Hours	42 hours

For further information, consult the Purdue University *Graduate School Bul letin* and the *Calumet Campus Announcement,* or contract the Department o Administrative Sciences, Calumet Campus Purdue University, Hammond Indiana.

GRADUATE PROGRAMS IN MATHEMATICS

Two programs, **Master of Science (Option for Teachers)** and **Master of Arts in Teaching,** are offered at the Calumet Campus by the Department of Mathematical Sciences. Both programs are designed primarily for the secondary school (grades 7-12) mathematics teacher.

Besides satisfying the general regulations of the Graduate School, the student must complete the following requirements for either program.

1. *Plan of Study.* Students preparing for candidacy should submit an acceptable plan of study to the advisory committee before the end of the second semester of graduate study. In any case, a plan of study must be approved by the department and the Graduate School before the student registers for the semester in which the degree is expected.

2. *Examinations.* Normally a student who has completed an approved plan of study, with all grades of A or B with the possible exception of 2 C's, is not required to take a comprehensive examination. However, at the discretion of his or her advisory committee, a student may be required to pass comprehensive written and/or oral examinations.

These programs require a minimum of 33 semester hours of graduate credits in course work.

Master of Science (Option for Teachers). The plan of study should include: four courses in algebra and analysis selected from MA 525, 540, 541, 553, and 554; general topology (MA 571); probability and statistics (STAT 516); one course in geometry selected from MA 561 and 563; one additional course in mathematics, computer science, or statistics to be selected with the approval of the advisory committee.

Master of Arts in Teaching. This program is open primarily to those secondary school teachers whose mathematics background is not sufficient to permit candidacy for the M.S. (Option for Teachers) degree. The M.A.T. is not intended to be preparatory for a Ph.D. degree in mathematics or mathematics education.

A plan of study will normally include six semesters in algebra, six semester hours in geometry, six semester hours in analysis, and one course in mathematics, computer sciences, or statistics to be selected with the approval of the advisory committee. Courses which meet these requirements include MA 547, 548, 550, 551, 561, and 563. A student who has completed a course equivalent to any of these as an undergraduate must substitute a more advanced course unless it is determined by his advisory committee not to be feasible. The student must complete 12 additional hours. These may be in related areas.

Additional Information

Consult the Graduate School bulletin for further information concerning regulations and descriptions of courses.

Plans of Study and Description of Courses

Courses numbered 1-499 are primarily for undergraduate students. Courses numbered 500-599 are for undergradautes (usually juniors and seniors) and graduate students. Courses numbered 600 and above are for graduate students.

For each course the first part of the description should be interpreted as follows: first, the official number of the course; second, its special title; and third, the number of class, laboratory, and credit hours.

ABBREVIATIONS

AS—Administrative Sciences
A&D—Art and Design
A&AE—Aeronautical and Astronautical Engineering
AGEC—Agricultural Economics
AGR—Agriculture
AGRY—Agronomy
ANSC—Animal Science
ANTH—Anthropology
ART—Architectural Technology
AT—Aviation Technology
AUS—Audiology and Speech Sciences
BCHM—Biochemistry
BIOL—Biological Sciences
CDFL—Child Development and Family Life
C S—Computer Sciences
C E—Civil Engineering
C&T—Clothing and Textiles
CET—Civil Engineering Technology
CHE—Chemical Engineering
CHM—Chemistry
CHT—Chemical Technology
CNT—Construction Technology
COM—Communication
CPT—Computer Technology
ECON—Economics
ED—Education
EE—Electrical Engineering
EET—Electrical Engineering Technology
EG—Engineering Graphics
ENGL—English
ENGR—Engineering
ENTM—Entomology
F&N—Foods and Nutrition
FOR—Forestry and Conservation
FR—French
G S—General Studies
GEOS—Geosciences
GER—German
GNS—Community College
HE—Home Economics
HEED—Housing, Equipment, and Environmental Design
H&S—Health and Safety
HIST—History
HMFE—Home Management and Family Economics
HORT—Horticulture
IE—Industrial Engineering
IED—Industrial Education
IET—Industrial Engineering Technology
INDM—Industrial Management
M E—Mechanical Engineering
MA—Mathematics
MET—Mechanical Engineering Technology
MSE—Materials Engineering
MTT—Metallurgical Engineering Technology
MUS—Music History and Theory
NUR—Nursing
NUCL—Nuclear Engineering
PCOL—Pharmacology
PEMN—Physical Education for Men
PEW—Physical Education for Women
PHIL—Philosophy
PHYS—Physics
POL—Political Science
PSY—Psychology
RECR—Recreation
SOC—Sociology
SPAN—Spanish
SPV—Supervision
STAT—Statistics
THTR—Theater

ACADEMIC SERVICES

Evening Administration

Recognizing that many students at the Calumet Campus attend evening classes and are unable to come to the campus during the normal business day,

the University has established an Evening Administration Office. Through this office (currently located in room 70A of the Gyte Building) the Assistant to the Vice Chancellor for Academic Affairs has the authority to act for the Calumet Campus administration as needed during evening hours. In addition to serving as a clearing house for general student problems which arise during the evening, he may also serve as advisor for students who need immediate assistance and are unable to contact their regular advisor or for special students who have no assigned advisor.

TUTORING

Purdue University Calumet has implemented a new program of Special Services under which tutoring facilities are available to all students of the university who need extra help in their course work. The tutoring program is administered through the office of the Vice Chancellor for Academic Affairs. The tutoring is done either in small groups or on an individual basis. The tutoring sessions are arranged to accommodate the student's class schedule. The tutoring staff generally consists of undergraduate or graduate students who are academically qualified in the particular discipline and who are recommended by the department concerned.

Any faculty member, academic advisor, or the Dean of a School may refer a student for this service to the office of the Director of Special Services. A student may also avail himself of the service through self-referral. Faculty and students are encouraged to apply for the tutoring service early in the semester to get maximum benefit from the program.

School of Basic and Applied Sciences

Richard L. Gonzales, Dean

MISSION AND ORGANIZATION

The mission of the School of Basic And Applied Sciences is to provide high quality educational programs for students whose interests and aptitudes are based in the broad spectrum of the sciences. The scope of this mission includes the spectrum from state of the art technologies to the pure sciences. The School offers a wide range of programs and courses both on the undergraduate and graduate level which will prepare students for a variety of career opportunities. For a description of graduate programs available see the section of this catalog titled "Graduate Study."

The problems facing society today are vast. However, new discoveries and applications are occurring at a rate unequaled in the history of mankind. Graduates of the School of Basic And Applied Sciences will ultimately deal with and contribute to the solution of today's and tomorrow's problems. A few of the areas of present concern include population growth, pollution, energy, food production, economics, management, transportation, health care and education.

The School is organized around eleven departments as follows:

Department of Administrative Sciences
Department of Biology
Department of Chemistry
Department of Computer Technology
Department of Construction Technology
Department of Electrical Technology
Department of Engineering
Department of Manufacturing Technology
Department of Mathematical Sciences
Department of Nursing
Department of Physics

The programs of study are discussed in detail in the following departmental sections of this catalog. The degrees granted by the School of Basic And Applied Sciences include the following:

Graduate Degrees (See Section on Graduate Study)
Associate of Applied Science
Bachelor of Science
Bachelor of Science Industrial Management
Bachelor of Science in Engineering

In addition, the following certificates are awarded:

Practical Nursing
Professional Supervision
Practical Industrial Electronics
Mechanical Instrumentation Systems Program

Students can readily transfer between the various campuses of Purdue University. Plans of study can be arranged so that a student can complete a portion of his work at the Calumet Campus and transfer to the Lafayette Campus or another Purdue campus for the completion of his degree requirements.

Some of the departments in the School of Basic And Applied Sciences have programs of study designed for prospective high school teachers. These secondary school teaching degree programs meet the Indiana Certification requirements. A detailed description of these programs can be found in the appropriate departmental sections of this catalog.

ADMISSION REQUIREMENTS

The admission requirements for a particular program are described in the appropriate departmental sections of this catalog.

COOPERATIVE EDUCATION PROGRAMS

The School offers some cooperative education programs. These programs constitute a well defined plan of work experience and formal study. Students interested in this program are encouraged to discuss these opportunities with the School's Co-op Coordinator or their academic advisor.

DEPARTMENT OF ADMINISTRATIVE SCIENCES

E. Eugene Engle, Head

FACULTY: C. W. Anderson, P.H. Empey, E. E. Engle, J. M. Furdek, D. J. Guy, F. D. Hays, M. Jain, R. S. Weisler

INDUSTRIAL MANAGEMENT

As Modern Society makes increasing use of technology, managers must keep informed to handle their own jobs effectively and to be able to understand and cooperate with the technical specialist. The industrial management curriculum by including a required technical sequence, enables the student to take advantage of Purdue's excellent resources in science and technology. Through the technical option, students are provided an opportunity to acquire a basic understanding on a specific area in the field of science and technology. Such an objective is essential if the individual is to be capable of working effectively with engineers and scientists in a technically-cased industry.

Included in the curriculum is a concentration of mathematics and quantitative methods courses designed to provide the necessary training and background in the use of rigorous analytic techniques applicable to management decisions. This program is designed to help the student develop this kind of broad understanding of the management process.

An administrator cannot be made in the short span of a few months or a year. Indeed, most individuals require years of experience to develop the skills, insights, and maturity of judgment which distinguish an effective manager. However, a professional management curriculum can give the student an effective start in his development as a manager. In brief, it can help him become a more useful member of his organization early in his career, and it can aid him in learning and growing more rapidly in positions of increasing responsibility.

GENERAL MANAGEMENT

In contrast to the technically-based internal approach utilized in the Industrial Management program, the general management curriculum provides a coordinated series of courses in the field of economics and business as a means of developing a broad fundamental background in business organization and the economic environment in which a business operates. The program includes four two-semester sequences covering economic principles, aggregative economics, statistics, and accounting, plus courses in business law and managerial economics. In addition, three related courses in economics and business, of special interest to the student, make possible a degree of specialization. Elective hours permit either further concentration in economics or enrichment in the general education area.

Business leaders, employment officials, and schools for advanced study, such as law schools, have endorsed this type of economics and business education with a liberal arts background. The program satisfies the need of future junior business executives for a broad, liberal-arts-oriented base on which to build specific training and experience received on the job.

ADMISSIONS CRITERIA

Acceptance as a new student in the University is influenced by many factors (high school subjects and record, quality requirements, required tests and counselor information). More specifically, the Admissions Committee is guided by the following:

1. Graduation from high school accredited by a State Department of Public Instruction with a minimum of 15 units.
2. The extent to which minimum subject matter requirements are met or exceeded. Most applicants exceed the minimum requirements indicated in the table below. For admission to the Department of Administrative Sciences, the record must include:

SUBJECTS	NUMBER OF SEMESTERS
English	6
History or social studies	2
Academic mathematics	6
Laboratory science	2

3. The extent to which quality requirements are met or exceeded.
   a. Indiana applicants
      1) To be eligible for admission, Indiana applicants should be upper-half quality students.
      2) Providing other factors are favorable, upper-half quality usually is met by rank in the upper half of the high school graduating class and may be met with SAT scores in the upper half of national norms (V+M totaling 950).
   b. Out-of-state applicants
      1) To be eligible for admission, out-of-state applicants should be upper-third quality students.
      2) Providing other factors are favorable, upper-third quality usually is met by rank in upper third of the high school graduating class and may be met with test scores in the upper third of national norms (SAT-V+M totaling 1050 or an ACT composite totaling 22).
   c. All sons and daughters of Purdue alumni will be evaluated for admission eligibility on in-state requirements.
4. Required tests.
   a. All applicants who have not completed a full year of college work are required to take the College Board Scholastic Aptitude Test (SAT) or the American College Test (ACT).
   b. Students who desire an early admission decision are encouraged to take their college entrance test in the spring of their junior year.
5. Information provided by the high school counselor.

ADMISSION WITH ADVANCED STANDING

On the results of any College Board achievement tests that are taken, Purdue departmental examination results, or the high school record, a newly-admitted student may receive advanced credit and/or advanced placement.

PASS/NOT PASS

Students may elect to take some courses under the pass/not pass option. This program allows a student to take a course without concern about the grade and will, hopefully, encourage course work of a more challenging level. The guidelines are:

1. To receive a pass grade, the student must earn the equivalent of C or better. Grades of D or F are considered Not Pass.
2. Students in the Department of Administrative Sciences may not elect the pass/not pass option for more than 15 total credit hours. The areas in which students may select courses under the pass/not pass option are the general education group area and the elective area.
3. No case course may be selected under this option.
4. Students who are on academic probation must complete at least 12 hours of letter grade course work for that semester. Students who are placed on academic probation for the second consecutive semester may not elect the pass/not pass option until they are removed from the probationary status.
5. If a letter grade has been received in a given course, that course may not be repeated under the pass/not pass option. Similarly, a course in which a Pass grade was received may not be repeated with the letter grade option. If any Not Pass grades are received, the students can elect to repeat any or all of these courses for letter grades.
6. Any student who elects the option should be classified 4 or higher. Students classified as 3 may select the option if the circumstances warrant such action.
7. The student will be discouraged from electing the pass/not pass option for more than one course per semester.

INDUSTRIAL MANAGEMENT

(Minimum credits for degree: 123)

FRESHMAN YEAR

First Semester		Second Semester	
(4)	Chemistry-physics requirement*	(4)	Chemistry-physics requirement*
(3)	COM 114 (Fundamentals of Speech Communication)	(3)	ECON 210 (Principles of Economics)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(1)	INDM 100 (Management Lectures)	(1)	ENGL 185 (Developmental Reading)
(5)	MA 163 (Plane Analytic Geometry and Calculus I)	(5)	MA 164 (Plane Analytic Geometry and Calculus II)
		(3)	General education group I (Two courses: English literature, history, philosophy)†
(16)		(19)	

* Chemistry—physics requirement: eight hours laboratory science selected from CHM 115, 116; PHY 152, 251, 220, 221.

† General education requirements consist of: group I—one two-course sequence group II and group III—one course each in two other areas.

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	ECON 251 (Microeconomics)	(3)	ECON 252 (Macrofinance)
(3)	INDM 200 (Introductory Accounting)	(3)	INDM 201 (Cost Accounting)
(4)	MA 261 (Multivariate Calculus)	(3)	Technical option
(3)	CS 210 (Laboratory on Data Processing)	(3)	Electives
(3)	General education group I†	(3)	General education group II†
(16)		(15)	

GENERAL MANAGEMENT

(Minimum credits for degree: 123)

FRESHMAN YEAR

First Semester		Second Semester	
(3)	COM 114 (Fundamentals of Speech Communication)	(3)	ECON 210 (Principles of Economics)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	General education group I elective‡	(3)	General education group I elective‡
(3)	Lab science I elective*	(3)	Lab science II elective*
(3)	MA 153 (Algebra and Trigonometry I)	(3)	CS 210 (Introduction to Data Processing)
(1)	INDM 100 (Management Lectures)	(3)	Elective
(16)		(18)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MA 213 (Finite Mathematics I)	(3)	ECON 252 (Macrofinance)
(3)	ECON 251 (Microeconomics)	(3)	INDM 201 (Cost Accounting)
(3)	General education group I elective‡	(3)	MA 214 (Finite Mathematics II)
(3)	AS 330 (Behavioral Sciences)	(3)	General Education group II‡
(3)	INDM 200 (Introductory Accounting)	(3)	General Education I‡
(15)		(15)	

† General education requirements consist of: group I—one two-course sequence group II and group III—one course each in two other areas.

* *LABORATORY SCIENCE*: Completion of any two semesters (6 hours minimum) in the following subject(s): Biology—103, 104, 108, 109;
Chemistry—111, 112, 115, 116;
Physics—152, 218, 219, 220, 221;
Geoscience—220, 361

‡ *GENERAL EDUCATION* requirements consist of: Group 1—taking one four-course sequence (not GS, Fine Arts or Anthropology); Groups 2 and 3—two 2-course sequences (to in-

JUNIOR YEAR

Fifth Semester

(3) General education group II elective*
(3) General education group IV elective*
(3) INDM 302 (Business Statistics)
(3) INDM 310 (Financial Management)
(3) INDM 300 (Financial Accounting I)

(15)

Sixth Semester

(3) General education group III elective*
(3) General education group IV elective*
(3) INDM 461 (Managerial Policy)
(3) INDM 430 (Labor Relations)
(3) Industrial Management option¶

(15)

SENIOR YEAR

Seventh Semester

(3) INDM 320 (Marketing Management)
(3) General education group III electives*
(3) INDM 455 (Legal Background in Business)
(3) Industrial management option¶
(3) Elective

(15)

Eighth Semester

(3) INDM 450 (Business Policy)
(3) Industrial management option¶
(6) Electives
(3) ECON 419 (Managerial Economics)

(15)

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clude psychology unless selected above); and Group 4—one course in one other area. The areas for selection and *initial* courses are:

1. American History—HIST 151 and 152
*2. Anthropology—ANTH 105, 204
3. English literature—Engl 230 or 238 and Engl 231
*4. Fine Arts—A&D 355 or MUS 250 or THTR 201
*5. General Studies—GS 101, 435, 436
6. Modern Language—French 101, 102, 203, 204; German 101, 102, 203, 204; Spanish 101, 102, 203, 204
7. Philosophy—PHIL 110 or 111
8. Political Science—American: POL 101, International: POL 141 and 230
9. Psychology—PSY 120, 570
10. Sociology—SOC 100, 220
11. World History—HIST 102, 103, 104
12. World Literature—ENGL 240 and 241

* Cannot be used as cultural sequence

¶ *THE INDUSTRIAL MANAGEMENT OPTION* consists of three courses taken from one of the following:

Accounting

INDM 401—Accounting Problems
INDM 402—Tax Accounting
INDM 490A—Accounting Concepts & Theory
INDM 501—Auditing
INDM 502—Management Accounting II

Finance

INDM 412—Money and Capital Markets
INDM 445—Investment Management
INDM 583—Small Business Management
ECON 352—Intermediate Macro-economics

Labor

INDM 431—Personnel Relations
INDM 553—Labor Law
PSY 570—Industrial Psychology
PSY 572—Organization Psychology
SOC 416—Industrial Sociology

Marketing

INDM 425—Marketing Planning & Control
INDM 583—Small Business Management
PSY 585—Psychological Foundations of Consumer Behavior

ADMINISTRATIVE SCIENCES

UNDERGRADUATE LEVEL

AS 330. BEHAVIORAL SCIENCES IN ADMINISTRATION. Class 3, cr. 3.

An integrated social science approach to administrative problems and administrative behavior. Behavior in organizations is examined in the context of psychological and sociological principles with attention given to such problems as motivation, influence, communication, leadership, small group processes, and organizational change. Emphasis is placed on the development of theoretical and empirical skills in diagnosing and responding to interpersonal problems as well as experience-based learning.

AS 430. SOCIAL RESPONSIBILITY OF BUSINESS. Class 3, cr. 3. Prerequisite: AS 330 or permission of the instructor.

The orientation will be an interdisciplinary approach to an examination of the moral, ethical, social, and practical implications of the social responsibility of business. The aim of the course will be to raise as many of the alternative issues as possible via class readings, films, tapes, and guest speakers from the academic (e.g., economics, management, administrative sciences) and the business community.

AS 431. INTRODUCTION TO ORGANIZATIONAL CHANGE AND DEVELOPMENT. Class 3, cr. 3. Prerequisite: AS 330 or permission of the instructor.

This course introduces the student to planned approaches to adaptation and change in organizations. It is based upon applied behavioral science research and concepts which address themselves to "real-life" change problems: models of the change process, change strategies, the change agent, the critical study of organizational change efforts.

AS 432. INTRODUCTION TO ADMINISTRATIVE DECISION MAKING. Class 3, cr. 3. Prerequisites: AS 330, INDM 302, senior standing, or permission of the instructor.

An introductory course in organizational decision making which focuses on the manager and examines critically his decision processes in situations that involve human behavior. Topics covered include a framework for the decision process, small group perspectives, organizational perspectives, and value dimensions of the decision process. The primary emphasis is on the individual manager and his performance as both a dependent variable within an organizational structure.

AS 490. PROBLEMS IN ADMINISTRATIVE SCIENCE. Cr. 1-4.

Supervised readings and reports in various subjects. Arrange with instructor before enrolling.

DUAL LEVEL
Undergraduate-Graduate

AS 590. PROBLEMS IN ADMINISTRATIVE SCIENCE. Cr. 1-4.

Supervised readings and reports in various subjects. Arrange with instructor before enrolling.

ECONOMICS

UNDERGRADUATE LEVEL

ECON 210. PRINCIPLES OF ECONOMICS Class 3, cr. 3.

Study of the basic economic institutions and the role they play in defining and achieving the nation's economic goals. Emphasis will be placed on the interdependent nature of the economy and the effects of economic discussions on the individual and society.

ECON 211. CONTEMPORARY ECONOMIC PROBLEMS. Class 3, cr. 3. Prerequisites: ECON 210.

Economic analyses of a number of problems such as pollution, poverty, regional economics, economics of education, economic stability, and development economics.

ECON 217. ECONOMICS.

National economic problems such as unemployment, recessions, inflation, taxation, bank interest rates, the growth of government, gold leaving the country, and a rising national debt are discussed along with the principles, policies, and institutions for solving these macroeconomic problems.

ECON 219. THE MEANING OF ECONOMICS (INTRODUCTORY)—FOR FUTURE TEACHERS. Class 3, cr. 3.

Structure and functioning of the American economic system, with emphasis upon the theory of the general levels of income, production, employment, and prices. Applications of economic knowledge as a tool for curriculum building and applications of the content of the course to the teaching of social sciences in the elementary and secondary school.

ECON 236. ECONOMIC DEVELOPMENT. Class 3, cr. 3.

Problems associated with the growth of the emerging nations of the world including economic, demographic, and political factors. In addition, some attention will be paid to location as a factor in economic development.

ECON 239. THE ROLE OF BLACKS IN AMERICAN ECONOMIC SOCIETY. Class 3, cr. 3.

Survey of the changing roles of Blacks in the American economy. Topics will include the slave economy, emancipation and the emergence of sharecropping after the Civil War, the Black migration to the North and the rise of the northern Black ghetto, the economics of discrimination, and other problems of Blacks in the labor market of modern capitalist society.

ECON 251. MICROECONOMICS. Class 3, cr. 3. Prerequisites: ECON 210.

Price theory and resource allocation. Emphasis is on developing a detailed understanding of the principles of microeconomics and analysis and their application to understanding price and market behavior.

ECON 252. MICROFINANCE. Class 3, cr. 3. Prerequisites: ECON 251.

Financial behavior of households, nonfinancial business, commercial banks, and other financial institutions. The determination of interest rates and financial flows, the effect of these on economic activity, and the special role of the federal reserve.

ECON 352. INTERMEDIATE MACROECONOMICS. Class 3, cr. 3. Prerequisites: ECON 210 and 251.

Macroeconomic behavior. The determinants of consumption, investment, and the aggregate demand for assets. The joint determination of income, the price level, and the rate of interest. The role of government. Elements of economic growth.

ECON 375. UNITED STATES ECONOMIC HISTORY. Class 3, cr. 3. Prerequisites: ECON 210.

A study of the growth of the American economy from colonial times to the late nineteenth century. Emphasis is placed on the application of the tools of economic analysis to historical questions concerning the sources and rate of growth, the relationships between growth and structural and institutional change, and the impact of industrialization of the quality of life in the American economy.

ECON 415. CONTEMPORARY ECONOMIC PROBLEMS AND POLICIES. Class 3, cr. 3. Prerequisites: ECON 251.

A study of economic policies designed to improve the attainment of economic goals. Emphasis is placed on the examination of the relationship between private decision making and public policy in such areas as health care, transportation, environmental protection, and income distribution.

ECON 419. MANAGERIAL ECONOMICS. Class 3, cr. 3. Prerequisite: ECON 212 or 251.

The application of economic analysis and common nonmathematical models to concrete business decisions, such as capital acquisition and replacement, optimum inventory, and pricing. Linear programming is considered.

ECON 425. GOVERNMENT AND BUSINESS. Class 3, cr. 3. Prerequisite: ECON 210, 213, or 217.

Basic problems of governmental control and regulation of business, with emphasis on regulation through administrative agencies, taxation and fiscal policy, and the antitrust laws.

ECON 434. INTERNATIONAL TRADE. Class 3, cr. 3. Prerequisite: ECON 210 or permission of instructor.

Comparative advantage (why countries trade). The effects of tariffs, customs unions (the Common Market). The balance of payments.

ECON 456. ECONOMICS OF THE CITY. Class 3, cr. 3. Prerequisites: ECON 251 and INDM 302 or equivalent.

Course examines alternative policies regarding urban housing markets, land use, transportation systems, environment protection, and poverty.

ECON 457. INDIVIDUAL STUDY, ECONOMICS OF THE CITY. Sem. 1 or 2. Arrange, cr. 2. Corequisite: ECON 456.

ECON 461. GOVERNMENTAL POLICY TOWARD BUSINESS. Class 3, cr. 3. Prerequisites: ECON 251 and INDM 302 or equivalent.

Course examines the rationale behind and actual effects of federal government statutes and policies in the area of: public utilities, quasipublic utilities, antitrust, consumer protection, and agriculture.

ECON 482. AMERICAN INDUSTRY AND ITS PLACE IN WORLD ECONOMY. Class 3, cr. 3. Prerequisite: ECON 210, 213, or 217.

Geographic and economic factors determining the location, structure, and economic power of leading American industries and their competitive position in the world economy.

ECON 490. PROBLEMS IN ECONOMICS. Cr. 1-4.

Supervised reading and reports in various subjects. Open only to a limited number of seniors with superior records in previous courses. Arrange with instructor before enrolling.

DUAL LEVEL
Undergraduate-Graduate

ECON 513. ECONOMIC THEORY. Class 3, cr. 3.

Theoretical analysis of a market economy with an emphasis on decision processes of managers. Consideration is given to microaspects of price determination, utilization of resources and market organization, and aggregate concepts of national income and employment.

INDUSTRIAL MANAGEMENT AND TRANSPORTATION

UNDERGRADUATE LEVEL

INDM 100. MANAGEMENT LECTURES. Class 1, cr. 1.

Survey of the field of industrial management.

INDM 200. INTRODUCTORY ACCOUNTING. Class 3, cr. 3 or Class 2, Lab. 2, cr. 3. (Required of undergraduate students in pre-industrial management and industrial economics.)

An examination of the system by which accounting data is gathered from economic events. Construction and uses of financial statements.

INDM 201. COST ACCOUNTING. Class 3, cr. 3. Prerequisite: INDM 200 or equivalent.

An introduction to internal uses of accounting information. Consideration of budgeting and various inventory costing methods.

INDM 202. FINANCIAL ACCOUNTING. Class 3, cr. 3. Prerequisite: INDM 200.

Study of financial problems in the valuation of assets and realization of income with emphasis on contemporary areas such as accelerated depreciation, leasing, price level changes, business combinations, and taxation.

INDM 300. FINANCIAL ACCOUNTING. Class 3, cr. 3. Prerequisite: INDM 201 or equivalent.

Intermediate level accounting. Financial reporting to management, investors, and interested external parties. Emphasis on wealth and income measurement and rule formulation in contemporary problem areas.

INDM 302. BUSINESS STATISTICS. Class 3, cr. 3.

Elementary statistics in business; descriptive statistics, parameter estimation, hypothesis testing, correlation and regression.

INDM 305. QUANTITATIVE METHODS FOR MANAGEMENT I. Class 3, cr. 3. Prerequisites: MA 261 and ECON 216 or 251.

An introduction to quantitative decision procedures under uncertainty and the foundations of probability theory and statistical decision theory.

INDM 306. QUANTITATIVE METHODS FOR MANAGEMENT II. Class 3, cr. 3. Prerequisite: INDM 305.

An introduction to quantitative decision procedures under uncertainty and mathematical model building. Linear programming and other topics in operations research.

INDM 310. FINANCIAL MANAGEMENT. Class 3, cr. 3. Prerequisite: INDM 201 or 202.

Management of the financial affairs of the industrial enterprise. Treats short-

term cash budgeting, asset management, capital budgeting, capital structure decisions, and dividend policy.

INDM 320. MARKETING MANAGEMENT. Class 3, cr. 3. Prerequisite: INDM 201 or equivalent.

A managerial approach to the job of learning to make a decision on product policy, distribution channels, pricing, personal selling, advertising, and marketing research.

INDM 401. ACCOUNTING PROBLEMS. Class 3, cr. 3. Prerequisite: INDM 201 or consent of instructor.

A study of advanced accounting topics useful to a financial manager including (1) accounting for nonprofit enterprises, (2) computer processed records, (3) the stewardship function, and (4) the application of quantitative techniques to some accounting problems.

INDM 402. TAX ACCOUNTING. Class 3, cr. 3. Prerequisite: INDM 200.

This course will primarily cover the major income tax issues involved in the tax computations and decisions of individuals, partnerships and corporations.

INDM 412. MONEY AND CAPITAL MARKETS. Class 3, cr. 3. Prerequisites: INDM 310 and ECON 252 or 330.

General subject matter in the financial behavior of households, corporations, the federal government, and financial institutions such as commercial banks, savings and loan associations, life insurance companies, and finance companies. Emphasis is on interaction of these sectors in the determination of various interest rates in recent years.

INDM 425. MARKETING PLANNING AND RESEARCH. Class 3, cr. 3. Prerequisites: INDM 201, 302, and 320.

The management of the marketing research function in industrial firms. Emphasis on market research and information systems for planning and control.

INDM 430. LABOR RELATIONS. Class 3, cr. 3. Prerequisite: a basic course in economic theory or consent of the department.

The course focuses on employee-employer relations under collective bargaining. Attention is also given to topics in trade union development and structure, wage analysis, the problem of economic insecurity, the role of government in labor relations, and employment aspects of the civil rights movement.

INDM 431. PERSONNEL RELATIONS. Class 3, cr. 3.

Study of the personnel administration function in the business firm. Traditional staff functions and line and staff roles in motivation of employees.

INDM 442. PERSONAL FINANCE. Class 3, cr. 3. Prerequisite: ECON 210 or 213.

Lectures and discussion on problems of managing one's personal finances. Covers budgeting; use of and cost of credit; life and property insurance; income and estate taxation; housing; wills, trusts and estate planning; saving and investments. Not available for credit towards economics and business economics concentrations.

INDM 445. INVESTMENT MANAGEMENT. Class 3, cr. 3. Prerequisite: ECON 210 or 213.

Examination of investment alternatives relevant to the individual investor. Operations of the markets in which securities are traded. Theory and application of security valuation and portfolio selection techniques. Evaluation of investment performances.

INDM 450. BUSINESS POLICY. Class 3, cr. 3. Prerequisite: INDM 310, 422, or 320 or equivalent. (Credit will not be given for both INDM 450 and 451.)

An extensive study of management problems in business at policy-making levels; primarily for students majoring in business economics.

INDM 455. LEGAL BACKGROUND IN BUSINESS. Class 3, cr. 3. Prerequisite: ECON 210, 213, or 217, or consent of instructor.

Nature and place of law in our society, social and moral bases of law enactment, regulation of business, legal liability, and enforcement procedures. Special emphasis on torts, contracts and agency.

INDM 456. LEGAL BACKGROUND FOR BUSINESS II. Class 3, cr. 3. Prerequisite: INDM 455 or 457. Continuation of INDM 455.

A study of the legal effect and ramifications of negotiable instruments, bailments, security interests, and sales in the world of commerce. Discussion of the legal problems concerning real property, personal property, and economic relations and the law.

INDM 461. MANAGEMENT OF OPERATIONS. Class 3, cr. 3. Prerequisite: INDM 302 or consent of instructor.

An introductory course concerned with the management of production, distribution, and service system operations. The topics covered include facilities planning, job design, materials control, and the management of product quality.

INDM 490. PROBLEMS IN INDUSTRIAL MANAGEMENT. Cr. 1-4. Arrange with instructor before enrolling.

Investigation in a specific management field.

DUAL LEVEL

Undergraduate-Graduate

INDM 501. AUDITING. Class 3, cr. 3. Prerequisite: INDM 300.

A study of the auditing area of accountancy including the professional environment and uniform examinations.

INDM 502. MANAGEMENT ACCOUNTING II. Class 3, cr. 3. Prerequisite: INDM 201.

A continuation of IM 201, Management Accounting I. Topics covered will include decentralized financial performance measurement, cost analysis techniques, costs in planning and decision models, and financial control systems.

INDM 553. LABOR LAW I. Class 3, cr. 3. Prerequisite: INDM 430 or consent of instructor.

A study of the common law and statutory law affecting union-management relations, with emphasis on current labor legislation including such areas as the National Labor Relations Act and amendments, the Railway Labor Act, wage and hour legislation, workmen's compensation, and social security laws.

INDM 583. SMALL BUSINESS MANAGEMENT. Class 3, cr. 3. Open only to seniors and graduate students.

Business policy and problems as they are specifically related to the small company.

INDM 584. NEW ENTERPRISES. Class 3, cr. 3. Prerequisite or corequisite: INDM 310 or INDM 610. (Not open to students with credit in INDM 583).

This course will serve primarily seniors in the B.S.I.M. and B.S. programs and graduate students in the M.S.M. program. The purpose is to develop competence in recognizing, analyzing, and dealing effectively with the wide range of problems encountered in establishing new firms or managing small firms.

INDM 590. DIRECTED READINGS IN INDUSTRIAL MANAGEMENT. Cr. 1-3. Arrange with instructor before enrolling.

Supervised reading and reports in various subjects. Open only to a limited number of seniors and graduate students.

GRADUATE LEVEL

For description of graduate courses, and prerequisites, consult *The Graduate School* bulletin.

INDM 600. FINANCIAL CONTROL I. Class 2. Lab. 2, cr. 3.

INDM 601. FINANCIAL CONTROL II. Cr. 3.

INDM 611. FINANCIAL MANAGEMENT II. Class 3. Cr. 3.

INDM 614. SEMINAR IN MANAGERIAL FINANCE I. Class 3. Cr. 3.

INDM 615. SEMINAR IN MANAGERIAL FINANCE II. Class 3. Cr. 3.

INDM 616. SEMINAR IN INVESTMENTS. Class 3. Cr. 3.

INDM 620. MARKETING PLANS AND DECISION MAKING. Class 2. Lab. 2, cr. 3.

INDM 630. LEGAL AND SOCIAL FOUNDATIONS OF MANAGEMENT. Cr. 1-3.

INDM 631. THE PERSONNEL FUNCTION. Class 3, Cr. 3.

INDM 632. COLLECTIVE BARGAINING. Class 3, cr. 3.

INDM 633. MANPOWER MANAGEMENT. Cr. 1 or 2.

INDM 636. GOVERNMENT AND INDUSTRIAL RELATIONS. Class 3, cr. 3.

INDM 650. MANAGERIAL POLICY I. Cr. 1.

INDM 651. MANAGERIAL POLICY II. Cr. 2 or 3.

INDM 660. OPERATIONS MANAGEMENT I. Class 3, cr. 3.

INDM 661. OPERATIONS MANAGEMENT II. Class 3, cr. 3.

INDM 670. QUANTITATIVE METHODS I. Cr. 2.

INDM 671. QUANTITATIVE METHODS II. Cr. 2.

INDM 672. QUANTITATIVE METHODS III. Cr. 1 or 2.

ARCHITECTURAL TECHNOLOGY—See Department of Construction Technology

DEPARTMENT OF BIOLOGY

Jane R. Shoup, Acting Head

FACULTY: T. J. Dougherty, J. C. Neeley, R. L. Peloquin, J. R. Shoup, C. C. Tseng, J. F. Wermuth, R. J. Werth, K. S. Wilson

BIOLOGY

The Department of Biology offers four programs leading to the Bachelor of Science degree, a one-year program in Prepharmacy, and three two-year transfer programs offered in cooperation with the School of Agriculture. These are:

1. **The Biology Program.** This program is designed for students interested in any of the areas of basic biology. By choosing an appropriate plan of study within this program a student can specialize in botany, microbiology, zoology, or general biology either with the B.S. as a terminal degree or in preparation for graduate work.
2. **The Premedical and Predental Program.** The plans of study in this program differ from those in the preceding program only in requiring fewer credits in biology and in providing an opportunity for some students to fulfill their requirements for the B.S. by taking three-fourths of the total credit hours required for graduation, including all required courses, in six semesters and successful completion of the first year at an accredited medical or dental school. Premedical and predental students must consult catalogs of medical and dental schools to which they wish to apply for specific entrance requirements. Also, it should be noted that majors other than in science are acceptable to some medical and dental schools.
3. **The Medical Technology Program.** The plans of study in this program include six semesters of work at Purdue University covering three-fourths of the total credit hours required for graduation and all required courses, followed by a full year of work at an approved school of medical technology and a successful Board of Registry examination.
4. **The Biology Teaching Program.** The plans of study in this program are designed for prospective high school teachers in biology. Such students should note that, in addition to meeting the requirements for the degree, it is essential for them to complete the requirements for certification imposed by the state in which they expect to teach.

   After 30 hours of college credit, a student pursuing programs for teacher certification must comply with the following requirements:

   1. Complete ED 285 (Educational Psychology)
   2. Meet the minimum academic requirements:
      a. 4.0 in English composition
      b. 4.0 in teaching major
      c. 4.0 graduation index

3. Pass a speech and hearing test
4. Be admitted to teacher education

A student must file his application for student teaching by February 15 of the year prior to the academic year in which he plans to do student teaching. Applications for student teaching will be accepted only from students who have been admitted to teacher education.

All of the undergraduate programs offered by the Department of Biology are based on a sequence of formal courses which are designed to convey the common body of thought and information which is essential to the training of biologists regardless of their ultimate specialization. This sequence consists of Principles of Biology (BIOL 103, 104), Structural Biology (BIOL 260, 261), Environmental Biology (BIOL 285), Cell Biology (BIOL 520, 521), Developmental Biology (BIOL 566, 567), and Genetic Biology (BIOL 541, 542). The distinctive feature of this biology core is that each unit, though administered as a traditional course, forms part of an intellectually meaningful sequence in which the major ideas of biology are developed more or less in parallel, with examples chosen from all groups of living systems, and including the properties of the living state at all levels of organization.

The accompanying table gives a general plan of study for each of the four undergraduate programs.

Each plan consists of (1) the core courses in biology; (2) certain specified courses in chemistry, physics, and mathematics; (3) in some cases, additional elective courses in biology; (4) the School of Science course requirements; and (5) for prospective teachers, certain education courses. In the medical technology program, three of the core biology courses are replaced by other courses in biology.

5. **The Prepharmacy Program.** Students wishing to prepare for the profession of pharmacy may complete one year of prepharmacy on this campus registered in the School of Science. The application for admission to the School of Pharmacy and Pharmacal Sciences (West Lafayette Campus) must be submitted before February 14 to insure consideration for the fall semester. Students who are not admitted to the school after one year of prepharmacy should apply for transfer to another school in the University or remain in the School of Basic And Applied Sciences, with a change of educational objective.
6. **Programs in the School of Agriculture.** The first two years of the General Agriculture, Forestry, and Preveterinary Medicine are offered within the Biology Department. Plans of study are outlined under School of Agriculture offerings in the section titled "Transfer Programs".

Admission requirements for Biology

Admission to the B.S. programs offered within the Biology Department requires that students rank in the upper one-half of their high school class or upper one-third for out-of-state students. Subject matter requirements include: three semesters of high school algebra, two semesters of geometry, one semester of trigonometry, two semesters of a lab science, and six semesters of English. The SAT or ACT tests must also be taken.

GENERAL PLANS OF STUDY

	Botany, Microbiology (a), Zoology, and General Biology credits	Premedicine and Predentistry credits	Medical Technology credits	Biology (b) Teaching credits
General Education				
English Composition	4	4	4	4
Modern Language	12 (c)	12 (c)	6 (c)	6 (c)
Humanities, Social, and Behavioral Sciences	18	18	18	18
Biology				
Principles of Biology (BIOL 103, 104)	6	6	6	6
Structural Biology (BIOL 260, 261)	4	4	4	4
Environmental Biology (BIOL 285)	3	3	—	3
Cell Biology (BIOL 520, 521)	4	4	4	4
Developmental Biology (BIOL 566, 567)	4	4	—	4
Genetic Biology (BIOL 541, 542)	4	4	—	4
Additional courses	4 (d)	—	10 (e)	3 (f)
Chemistry				
General Chemistry including Qualitative Analysis (CHM 111, 112, 223, or CHM 115, 116)	8-10 (g)	8-10 (g)	8-10 (g)	8-10 (g)
Analytical Chemistry (CHM 321) or Introductory Quantitative Analysis (CHM 224)	4 (h)	4 (h)	4 (h)	4 (h)
Organic Chemistry (CHM 261, 263L, 262, 264L) or (CHM 255, 255L, 256, 256L)	8	8	8	8
Physics				
General Physics (PHYS 220, 221) or the sequence (PHYS 152, 251, 342, 342L)	8 (i)	8 (i)	8 (i)	8 (i)
Mathematics				
Introductory Analysis (MA 223, 224) and any two of the following: Statistics (STAT 301, 302), Computer Sciences (CS 220), and Finite Mathematics (MA 213) or Mathematics (MA 163, 164) and either Statistics (STAT 301) or Computer Sciences (CS 220)	12-13 (j)	12-13 (j)	12-13 (j)	12-13 (j)
Remaining Electives	18-21 (a)	22-25 (k)	29-32 (l)	7-10

FOOTNOTES TO TABLE

(a) The American Board of Microbiology, a Committee of the American Academy of Microbiology, has established a National Registry of Microbiologists to recognize individuals at the bachelor's level who have an adequate understanding of the scientific bases of applied methods. Part of the requirements for registration specify 30 credits in biological science, 20 of which must be in microbiology. It is likely that for classification as a microbiologist by the U. S. Civil Service Commission, similar criteria will be used. Majors in microbiology should consider this in the choice of their elective courses. It is likely that a portion of the biology core will be counted as microbiology; consult a counselor regarding this.

(b) The following education courses are required in this program: Educational Psychology (ED 285), Principles of Teaching (ED 304), Teaching of High School Biology (ED 402), Teaching of High School Chemistry (ED 404), Supervised Teaching (ED 424), and The American School System (ED 485). These total 18 credits. Students interested in obtaining a minor in chemistry or general science should consult a counselor to ascertain current requirements.

(c) German, Russian, and French are recommended for the student who expects to pursue graduate studies in science.

(d) Majors in botany and zoology must select an advanced course dealing mainly with plants and animals, respectively: microbiology majors must take BIOL 524 (Microbiology).

(e) The additional courses should be chosen from among the following electives: Introduction to Microbiology (BIOL 220 or 221). Microbiology (BIOL 524), General Mycology (BIOL 527, 528), Medical Microbiology (BIOL 533) or any core course in the Department of Biological Sciences for which the student qualifies.

(f) Biology teaching majors must take Biological Conservation (BIOL 482).

(g) The preferred sequence is Chem 111-112, 223; with exceptionally strong high school chemistry background, students may take Chem 115-116 sequence.

(h) The preferred course is Analytical Chemistry (CHM 321), particularly for students specializing in quantitative areas of biology.

(i) The sequence PHYS 152, 251, 342, 342L (13 credits) is preferred, and is recommended for students planning to take advanced physics courses. The mathematics sequence MA 163, 164 is necessary for PHYS 152, 251, 342, 342L.

(j) Students planning to continue with more advanced mathematics or planning to take the PHYS 152, 251, 342, 342L sequence and/or physical chemistry (CHM 373, 374) sequences, should choose the MA 163, 164, STAT 301 or CS 220 sequence if they have adequate preparation. Those who intend to enter quantitative areas of biology after graduation are encouraged to continue with MA 261, 262. Premedical, predental, medical technology, and biology teaching majors may satisfy their requirement via the first or second option, or less desirably by taking any four of the courses listed under the first option (MA 223, 224, 213; STAT 301, 302; CS 220). Students with deficient high school mathematics are advised to take MA 151 or MA 153, 154 in addition to the requirements under the first or second option.

(k) Completion of the first year in an accredited medical school can be substituted for these.

(l) Successful completion of 12 months training in a school of medical technology (approved by the Board of Schools of Medical Technology of the American Society of Clinical Pathologists and by Purdue University) and of an examination given by the Board of Registry can be substituted for these. Students wishing to continue residence at Purdue University for a fourth year must complete the same requirements as do majors as listed in the first column.

Programs 1 and 2: Biology, Premedicine, and Predentistry

FRESHMAN YEAR

First Semester

(3) BIOL 103 (Principles of Biology)
(3-4) CHM 111 (General Chemistry) or CHM 115 (General Chemistry)
(3) ENGL 104 (English Composition I)
(3-5) MA 223 (Introductory Analysis I)
MA 163 (Integrated Calculus and Analytic Geometry I)
(3) Modern Language 101

(15-18)

Second Semester

(3) BIOL 104 (Principles of Biology)
(3-4) CHM 112 (General Chemistry)
or
CHM 116 (General Chemistry)
(3) ENGL 105 (English Composition II)
(3-5) MA 224 (Introductory Analysis II) or
MA 164 (Integral Calculus and Analytic Geometry II)
(3) Modern Language 102

(15-18)

SOPHOMORE YEAR

Third Semester

(4) BIOL 260, 261 (Structural Biology)
(4) CHM 255, 255L (Organic Chemistry)
(3) CS 220 (Introduction to Algorithmic Processes)
(3) Modern Language 203
(3) BIOL 285 (Environmental Biology)

(17)

Fourth Semester

3-4) H.E.S.S. elective or
CHM 223 (Introductory Quantitative Analysis) (See footnote (g))
(4) CHM 256, 256L (Organic Chemistry)
(3) STAT 301 (Elementary Statistical Methods I)
(3) Modern Language 204
(3) H.E.S.S. elective

(16-17)

JUNIOR YEAR

Fifth Semester

(4) BIOL 520, 521 (Cell Biology)
(4) BIOL 541, 542 (Genetic Biology)
(4) PHYS 220 (General Physics)
(3) H.E.S.S. elective
(3) H.E.S.S. elective

(18)

Sixth Semester

(4) BIOL 566, 567 (Developmental Biology)
(4) PHYS 221 (General Physics)
(4) CHM 224 (Introductory Quantitative Analysis)
(3) H.E.S.S. elective
(3) H.E.S.S. elective

(18)

SENIOR YEAR

(Alternative: one year at accepted Medical or Dental School)

Seventh Semester		Eighth Semester	
(3-4)	BIOL elective	(3-4)	BIOL elective
(3-4)	BIOL elective	(3-4)	BIOL elective
(3-4)	BIOL elective	(3-4)	BIOL elective
(3)	H.E.S.S. elective	(3)	H.E.S.S. elective
(12-15)		(12-15)	

Program 3: Medical Technology

FRESHMAN YEAR

(Same as Programs 1 and 2)

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	BIOL 260 (Structural Biology)	(3-4)	BIOL elective recommended: 220 or 221 (Introductive to Microbiology)
(4)	CHM 255, 255L (Organic Chemistry)	(4)	CHM 256, 256L (Organic Chemistry)
(3)	CS 220 (Introduction to Algorithmic Processes)	(3)	STAT 301 (Elementary Statistical Methods I)
(3)	H.E.S.S. elective	(3-4)	H.E.S.S. elective or CHM 223 (Introductory Qualitative Analysis) (See Footnote (g))
(3)	H.E.S.S. elective	(3)	H.E.S.S. elective
(17)		(16-17)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	BIOL 520, 521 (Cell Biology)	(4)	BIOL 566, 567 (Developmental Biology)
(4)	BIOL elective recommended: 557, 558 (Animal Physiology) or 524, (Microbiology) Or any BIOL Core Course	(4)	CHM 224 (Introductory Qualitative Analysis)
(4)	PHYS 220 (General Physics)	(4)	PHYS 221 (General Physics)
(3)	H.E.S.S. elective	(3)	H.E.S.S. elective
(15)		(3)	H.E.S.S. elective
		(18)	

SENIOR YEAR

12 months training in an affiliated school of medical technology

Program 4: Biology Teaching

FRESHMAN YEAR

(Same as Programs 1 and 2)

SOPHOMORE YEAR

Third Semester

(4) BIOL 260, 261 (Structural Biology)
(4) CHM 255, 255L (Organic Chemistry)
(3) BIOL 285 (Environmental Biology)
(3) PSY 120 (Elementary Psychology)
(3) Modern Language 203

(17)

Fourth Semester

(4) CHM 256, 256L (Organic Chemistry)
(3) CS 220 (Introduction to Algorithmic Processes)
(3) ED 285 (Educational Psychology)
(3-4) H.E.S.S. elective or CHM 223 (Introductory Qualitative Analysis)
(3) H.E.S.S. elective

(16-17)

JUNIOR YEAR

Fifth Semester

(4) BIOL 520, 521 (Cell Biology)
(4) PHYS 220 (General Physics)
(4) BIOL 541, 542 (Genetic Biology)
(3) H.E.S.S. elective

(15)

Sixth Semester

(4) BIOL 566, 567 (Developmental Biology)
(4) PHYS 221 (General Physics)
(4) CHM 224 (Introductory Quantitative Analysis)
(2) ED 304 (Principles of Teaching)
(3) STAT 301 (Elementary Statistical Methods I)

(17)

SENIOR YEAR

Seventh Semester (Professional Semester)

(2) ED 402 (Teaching of Biology in Secondary Schools)
(2) ED 404 (Teaching of Chemistry in Secondary Schools)
(3) ED 485 (The American School System)
(8) ED 424 (Supervised Teaching of Secondary School Subjects)

(15)

Eighth Semester

(3-4) BIOL electives
(3) H.E.S.S. elective
(3) H.E.S.S. elective
(3) H.E.S.S. elective
(3) H.E.S.S. elective

(15-16)

Program 5:

PREPHARMACY YEAR

First Semester		Second Semester	
(4)	BIOL 109 (Introduction to Zoology)	(4)	BIOL 108 (Introduction to Botany)
(4)	CHM 115 (General Chemistry)	(4)	CHM 116 (General Chemistry)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	MA 223 (Introductory Analysis) or MA 153 (Algebra and Trignometry I) *or* MA 163 (Integrated Calculus Analytic Geometry I)	(3)	MA 224 (Introductory Analysis II) *or* MA 154 (Algebra and Trignometry II)
(1-3)	H.E.S.S. elective	(1-3)	H.E.S.S. elective
(15-17)		(15-17)	

Students with adequate preparation may substitute MA 163 for the sequence MA 223-224.

Students with insufficient preparation may take MA 153-154 in the Freshman year and a mathematical analysis course during the Sophomore year (second year of five), in the School of Pharmacy and Pharmacal Sciences.

Although CHM 111-112, 223 may be substituted for CHM 115-116, the preferred sequence is the latter.

Each student should complete at least 32 credits during his prepharmacy year. Specific elective courses are not required; students may choose electives that coincide with their interests. It is recommended that a speech course be included if possible.

Students who do not receive their pre-pharmacy instruction on the Purdue West Lafayette Campus must schedule two one-hour courses after transferring: CLPH 100 and CLPH 101 (Pharmacy Orientation).

UNDERGRADUATE LEVEL

BIOL 103. PRINCIPLES OF BIOLOGY. Class 2, Lab. 2, cr. 3.
The nature of one living state and experimental approaches in studying it.

BIOL 104. PRINCIPLES OF BIOLOGY. Class 2, Lab 2, cr. 3.
Continuation of BIOL 103.

BIOL 108. INTRODUCTION TO BOTANY. Lec 1, Rec. 1-2, Lab. 4, cr. 4.
Introduction to the growth, functioning structures, heredity, diversity of plants, and their interactions with the environment.

BIOL 109. INTRODUCTION TO ZOOLOGY. Class 2, Lab. 4, cr. 4.
Introduction to the structure, functioning, heredity, development, classification, and evolution of animals, and their interactions with the environment.

BIOL 203. BIOLOGY OF MAN. Class 2, Lab. 2, cr. 3.
Introduction to human biology with emphasis on anatomy and physiology.

BIOL 204. BIOLOGY OF MAN. Class 2, Lab. 2, cr. 3.
Continuation of BIOL 203.

BIOL 211. THE SOCIAL IMPACT OF THE BIOLOGICAL SCIENCES. Class 2, Dem. and Disc. 2, cr. 3.
An introduction to basic concepts, experimentation, and information found within the biological sciences. Emphasis is placed upon the role of biology within the social framework. Relationships between this discipline and common social problems are explored.

BIOL 212. THE SOCIAL IMPACT OF THE BIOLOGICAL SCIENCES. Class 2, Dem. and Disc. 2, cr. 3.

A continuation of BIOL 211. It is recommended that this course be preceded by BIOL 211.

BIOL 220. INTRODUCTION TO MICROBIOLOGY. Class 2, Lab. 2, cr. 3. Prerequisites: one year of general chemistry and one semester of a life science.

The isolation, growth, structure, functioning, heredity, identification, classification, and ecology of microorganisms, their role in nature and significance to man.

BIOL 221. INTRODUCTION TO MICROBIOLOGY. Class 3, Lab. 3, cr. 4. Prereqsites: one year of general chemistry and one semester of a life science.

The isolation, growth, structure, functioning, heredity, identification, classification, and ecology of microorganisms, their role in nature and significance to man.

BIOL 260. STRUCTURAL BIOLOGY. Class 2, cr. 2 or Class 2, Lab. 3, cr. 3. Prerequisite: BIOL 104 or equivalent.

A description of biological structures at diverse levels of organization from molecules to multi-cellular organisms with emphasis on the relationship of structure and function.

BIOL 261. LABORATORY IN STRUCTURAL BIOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 260.

BIOL 285. ENVIRONMENTAL BIOLOGY. Class 2, Lab. 3, cr. 3. Prerequisites: A year of life science and a year of general chemistry.

Adaptation and competition, and the relationship of organisms to their physical environment. Natural selection and other aspects of evolution; origin and integration of species and communities; ecosystems.

BIOL 295. SPECIAL ASSIGNMENTS. cr. 1-4.

Special work, such as directed reading, independent study or research, supervised library, laboratory, or field work, or presentation of material not available in the formal courses of the department. The field in which work is offered will be indicated in the student's record. Required for M.S. candidates in the non-thesis option. May be repeated for credit.

BIOL 301. HUMAN DESIGN: ANATOMY AND PHYSIOLOGY. Class 2, Lab. 2, cr. 3. Prerequisites: BIOL 203, 204. Prerequisite or co-requisite; BCHM 100, or consent of instructor.

An analysis of the anatomy and physiology of the human organism at the molecular, cellular, and organ system levels. The fluids and gases which comprise the internal environment of the human organism will be examined to demonstrate basic homeostatic mechanisms. The relationship of structure to function will be investigated in the following areas: Cellular physiology, nervous system, muscular system, and immune-system.

BIOL 302. HUMAN DESIGN: ANATOMY AND PHYSIOLOGY. Class 2, Lab. 2, cr. 3.

A continuation of BIOL 301. The circulatory, respiratory, urinary, gastrointestinal, endocrine, and reproductive systems will be studied. Homeostatic mechanisms will be emphasized.

BIOL 495. SPECIAL ASSIGNMENTS. cr. 1-4

Special work, such as directed reading, independent study or research, supervised library, laboratory, or field work, or presentation of material not available in the formal courses of the department. The field in which work is offered will be indicated in the student's record. Required for M. S. candidates in the non-thesis option. May be repeated for credit.

DUAL LEVEL
Undergraduate-Graduate

BIOL 505. BIOLOGY OF INVERTEBRATE ANIMALS. Class 2, Lab. 4, cr. 4. Prerequisites: BIOL 109 or BIOL 260-261.

A survey of the invertebrate animals, their morphology, physiology, ecology, and phylogeny.

BIOL 520. CELL BIOLOGY. Class 2, cr. 2 or Class 3, Lab. 3, cr. 4. Prerequisites: a semester of a life science and a semester of organic chemistry; corequisite: BIOL 521, unless by consent of instructor.

Composition, structure, heredity, and growth of cells. Analysis of the cell concept in biochemical terms.

BIOL 521. LABORATORY IN CELL BIOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 520.

BIOL 522. CYTOLOGY. Class 2, cr. 2. Prerequisite: BIOL 104 or 108.

The molecular basis for structure in animals and plant cells. Organization and function of subcellular organelles. Energy transduction. Cell division and organelle development.

BIOL 523. LABORATORY IN CYTOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 522.

Isolation of cellular organelles and light microscope study of cell structure.

BIOL 524. MICROBIOLOGY. Class 3, cr. 3 or Class 2, Lab. 4, cr. 4. Prerequisites: BIOL 520 and 521.

Continuation of BIOL 520, with emphasis on bacteria and viruses, and more intensive study of their isolation, composition, structure, heredity, nutrition, metabolism, growth, reproduction and death, identification, classification, ecology, role in nature, and significance to man.

BIOL 527. GENERAL MYCOLOGY. Class 2, Lab. 3, cr. 3. Prerequisite: one semester of microbiology; corequisite: BIOL 528, unless by consent of instructor.

Survey of fungi with emphasis on form, structure, genetics, growth, nutrition, and classification.

BIOL 528. LABORATORY IN GENERAL MYCOLOGY. Lab. 4, cr. 2 or Lab. 2, cr. 1. Prerequisite or corequisite: BIOL 527.

BIOL 533. MEDICAL MICROBIOLOGY. Class 3, Cr. 3. Prerequisite: BIOL 520, 521 or BIOL 221.

Properties of microorganisms associated with infectious diseases. Interactions of microorganisms and their hosts. Principles of immunology and serology.

BIOL 534. LABORATORY IN MEDICAL MICROBIOLOGY. Lab. 4. Cr. 2. Must be preceded or accompanied by BIOL 533.

BIOL 541. GENETIC BIOLOGY. Class 2, Rec. 1, cr. 3. Prerequisites: BIOL 520 or both AGRY 430 and a course in biochemistry, or equivalents; corequisite: BIOL 542, unless by consent of instructor.

Quantitative, molecular, and physiological genetics, including a review of classical principles.

BIOL 542. LABORATORY IN GENETIC BIOLOGY. Lab. 2, cr. 1. Prerequisite: BIOL 541, unless by consent of instructor.

BIOL 551. PLANT PHYSIOLOGY. Class 3, cr. 3. Prerequisites: BIOL 104 or equivalent and BCHM 561 or BIOL 520.

Photosynthesis, mineral nutrition, nitrogen metabolism, water relations, respiration, and growth. Emphasis on quantitative aspects and current literature.

BIOL 552. LABORATORY IN PLANT PHYSIOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 551, unless by consent of instructor.

BIOL 557. ANIMAL PHYSIOLOGY. Class 3, cr. 3.

Cell physiology; irritability (excitation, contraction, receptors, transmission); nutrition; body fluids and respiration; circulation; nervous and humoral integration. Emphasis on cellular aspects and on application of quantitative techniques to physiology. Reading of original research papers.

BIOL 558. LABORATORY IN ANIMAL PHYSIOLOGY. Lab. 6, cr. 2. Prerequisite or corequisite: BIOL 556 or 557.

BIOL 560. PLANT STRUCTURE. Class 4, cr. 4. Prerequisite: BIOL 104 or 108 or equivalent.

All major plant groups will be studied in an intensive investigation of structure as related to function and classification. Students will learn and apply techniques of tissue preparation for microscopic observation and cytochemical analysis.

BIOL 566. DEVELOPMENTAL BIOLOGY. Class 2, cr. 2 or Class 2, Lab. 4, cr. 4. Prerequisites: BIOL 260, preceded or accompanied by BIOL 567, unless by consent of instructor.

Principles of development of plants and animals; the formation of organ systems.

BIOL 567. LABORATORY IN DEVELOPMENTAL BIOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 566.

BIOL 580. EVOLUTION. Class 3, cr. 3. Prerequisite: BIOL 104 or equivalent.

A study of evolution as a basic concept of the biological sciences; an examination of current methods of experimentation within the area, as well as evidences for and possible mechanisms of evolutionary change.

BIOL 588. PLANT ECOLOGY. Class 2, cr. 2. Prerequisite: BIOL 104 or 108 or equivalent.

The physico-chemical and biotic environment affecting plants in nature; the

dynamics of plant communities; ecological methods. Applications to agronomy, forestry, wildlife management, outdoor recreation, and other land-use interests.

BIOL 589. LABORATORY IN PLANT ECOLOGY. Lab. 4, cr. 2. Prerequisite or corequisite: BIOL 588.
Class field trips and laboratory exercises.

BIOL 591. ANIMAL ECOLOGY. Class 2, Lab. 3, cr. 3. Prerequisite: BIOL 285 or equivalent.
The role of animals in the ecosystem. The physiological and behavioral responses of animals to their environment.

BIOL 593. ETHOLOGY. Class 3, Lab. 3, cr. 4.
Animal behavior is analyzed in natural and experimental situations. Emphasis is on the observation of wild and domesticated animals. The effect of early experience, motivation, physiological mechanisms, adaptiveness and the evolution of behavior are considered.

BIOL 595. SPECIAL ASSIGNMENTS. Cr. 1-4.
Special work, such as directed reading, independent study or research, supervised library, laboratory, or field work, or presentation of material not available in the formal courses of the department. The field in which work is offered will be indicated in the student's record. Required for M.S. candidates in the nonthesis option. May be repeated for credit.

DEPARTMENT OF CHEMISTRY

Alan K. Roebuck, Head

FACULTY: A. H. Carlson, H. D. Fayle (Emeritus), R. R. Fryer, L. C. Gibson, H. R. Heydegger, N. K. Nelson, J. R. Phillips, T. J. Phillips, A. K. Roebuck, N. D. Yaney

Baccalaureate degree students electing chemistry as a major may select either of two degree programs, depending upon their interest. These are:

Bachelor of Science in Chemistry Degree

This degree program is designed primarily for students planning to go on to graduate study or preparing for an industrial career as a chemist. It is planned to fulfill the recommendations of the Committee on Professional Training of the American Chemical Society; graduates who follow this program will be certified to the American Chemical Society as having fulfilled recommended requirements.

Bachelor of Science Degree

(Chemistry major or chemistry teaching major)

This degree program contains the same basic courses in chemistry as the B.S. in Chemistry degree program but has fewer requirements and thus permits more electives from other areas. It is recommended that students build a program of study from another area to complement this basic but minimal chemistry program. It is particularly suited for students preparing for careers as chemistry teachers, geochemists, biologists, medical doctors, scientific librarians, science writers, chemical salesmen, chemical patent attorneys, or other careers which require a less highly specialized training in chemistry than is offered for the B.S. in Chemistry degree.

The chemistry, mathematics, and physics courses in this degree program meet the Indiana certification requirements for a secondary-school teaching major in chemistry.

GENERAL EDUCATION REQUIREMENTS

(a) Total Hours — A student must complete a total of 124 semester hours. An average of 15.5 hours per semester is sufficient to accumulate 124 hours in eight semesters. Students with a graduation index less than 5.0 are advised not to take more than 17 hours in any one semester.

(b) English Composition — One year of English composition or ENGL 103 entered by achievement examination and completed with a grade of C or better. Students who complete ENGL 104 with a grade of A may substitute any literature or writing course for ENGL 105.

(c) Modern foreign language — The student must pass a fourth semester college-level course in a modern foreign language or pass an equivalent proficiency examination. For the degree of B.S. in Chemistry the required language is German. A student who successfully completes the professional semester in a high school teaching curriculum need only pass a second-semester college level course in a modern foreign language or pass an equivalent proficiency examination.

(d) Mathematics — A student who completes the specialized requirements for the chemistry program will automatically satisfy the general education requirement in mathematics.

(e) Laboratory sciences other than chemistry. — A student is required to take at least four courses (preferably two-two semester sequences in different sciences such as physics, biology or geosciences). With permission of the Head of the Chemistry Department, a student may partially fulfill the laboratory science requirement by taking no more than two computer science or engineering courses.

(f) Humanities, social sciences and behavioral sciences. — There are three areas of study in this requirement:

(1) literature, philosophy and creative arts
(2) history and political science
(3) economics, sociology and psychology

The minimum requirement is 18 semester-hours chosen from the above three areas as follows:

(a) Choose a two course sequence from (1), (2), or (3) above.
(b) Choose any two courses (not necessarily a sequence) from an area not chosen in (a).
(c) Choose any other two courses from any of the areas (1), (2), or (3)

The three choices outlined above will give the student the required six hours in each of two (out of the three) areas, including one coherent two-course sequence.

The following courses are required for both the B.S. in Chemistry degree and the B.S. degree.

	Credits
General chemistry (115, 116, 220)	10 or 11
Organic chemistry (261, 262, 265L, 266L)	10
Physical chemistry (373, 374, 374L)	8
Analytical chemistry (321)	4
Inorganic chemistry (342)	3
Mathematics (163, 164, 261)	14
Physics (152, 251)	9
Total	58 or 59

Additional requirements for the B.S. in Chemistry degree:

The required modern language is German.	
Analytical chemistry (424)	4
Chemical literature (513)	1
Advanced chemistry electives	6
Mathematics (262)	4
Modern physics (342, 342L)	4
Total additional credit beyond the B.S. degree requirements	19
Total credit in chemistry, mathematics, and physics	77 or 78

Chemistry Teaching Option

The chemistry, mathematics, and physics requirements are the same as the B.S. degree with a chemistry major. The general education requirements exempt the second year of modern language. A total of 18 hours in professional education is needed. This includes a professional semester with practice teaching in chemistry.

After 30 hours of college credit, a student pursuing programs for teacher certification must comply with the following requirements:

1. Complete ED 285 (Educational Psychology)
2. Meet the minimum academic requirements:
   a. 4.0 in English composition
   b. 4.0 in teaching major
   c. 4.0 graduation index
3. Pass a speech and hearing test
4. Be admitted to teacher education

A student must file his application for student teaching by February 15 of the year prior to the academic year in which he plans to do student teaching. Applications for student teaching will be accepted only from students who have been admitted to teacher education.

Admission Requirements

Admission to either the B.S. in Chemistry or the Chemistry Major programs requires that the student be in the upper one-half of his high-school class or in the upper one-third for out-of-state students. Admission requirements include the following subjects: three semesters of high-school algebra, two semesters of geometry, and one semester of trigonometry. A total of eight semesters of high-school math is preferable and should include an introduction to calculus and analytical geometry. Admission requirements also include two semesters of laboratory science (chemistry preferred) and six semesters of English. The SAT or ACT tests must be taken.

Admission to the Chemical Technology program requires that the student be in the upper two-thirds of his high-school class, or the upper one-third for out-of-state students. Admission requirements include the following subjects: two semesters of high-school algebra, two semesters of geometry, two semesters of laboratory science, and six semesters of English. The SAT or ACT tests are also required.

Pass No-Pass Option

Pass no-pass option courses can be taken only with the consent of the Head of the Chemistry Department.

PLAN OF STUDY

FRESHMAN YEAR

First Semester		Second Semester	
(4)	CHM 115 (General Chemistry)	(4)	CHM 116 (General Chemistry)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	GER 101 (First Course in German)	(3)	GER 102 (Second Course in German)
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(15)	Plus physical education (for women)	(15)	Plus physical education (for women)

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(2)	CHM 220 (General Chemistry)*	(3)	CHM 262 (Organic Chemistry)
(3)	CHM 261 (Organic Chemistry)	(2)	CHM 266L (Organic Chemistry Laboratory)
(2)	CHM 265L (Organic Chemistry Laboratory)	(4)	MA 262 (Linear Algebra and Differential Equations)
(4)	MA 261 (Multivariate Calculus)	(5)	PHYS 251 (Heat, Electricity, and Optics)
(4)	PHYS 152 (Mechanics and Sound)	(3)	GER 244 (Fourth Course in Scientific German)
(3)	GER 203 (Third Course in German)		
(18)		(17)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	CHM 321 (Analytical Chemistry I)	(3)	CHM 374 (Physical Chemistry)
(3)	CHM 373 (Physical Chemistry)	(2)	CHM 374L (Physical Chemistry Laboratory)
(3)	PHYS 342 (Modern Physics)	(1)	CHM 513 (Chemical Literature)
(1)	PHYS 342L (Modern Physics Laboratory)	(6)	Humanities, etc.
(6)	Humanities, etc.	(3)	Elective
(17)		(15)	

* For students with CHM 115-116 sequence.

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	CHM 342 (Inorganic Chemistry)	(4)	CHM 424 (Analytical Chemistry II)
(3)	Humanities, etc.	(3)	Chemistry elective
(6)	Chemistry or science elective	(3)	Science elective
(3)	Elective	(3)	Humanities, etc.
		(3-6)	Electives
(15)		(16-19)	

A.A.S. DEGREE IN CHEMICAL TECHNOLOGY

This two-year college-level program in chemical technology is designed to train persons for employment in the chemical and allied products industries. This training will enable the technician to assist a chemist, chemical engineer, or plant supervisor to develop procedures, make technical measurements, develop research models and operate a chemical process or plant. Upon successful completion of the program the degree of Associate in Applied Science will be granted.

Two options are available: pharmaceutical (Indiana University-Purdue University at Indianapolis) and process development (Calumet Campus). In the Calumet region of Indiana and Illinois greater opportunities are presented to those choosing the general industrial option. The person who has chosen the pharmaceutical option will find ample opportunities for employment in the greater Chicago, Indianapolis, and South Bend-Elkhart areas. At present, the demand for chemical technicians far exceeds the supply. Each year many companies come to the Calumet Campus seeking persons qualified in chemical technology.

FRESHMAN YEAR

First Semester		Second Semester	
(4)	CHT 109 (General Chemistry)	(4)	CHT 212 (Industrial Chemistry: Qualitative)
(5)	MA 150 (Mathematics for Technology)	(3)	MA 221 (Calculus for Technology I)
(3)	ENGL 104 (English Composition I)	(5)	CHT 251 (Organic Chemistry)
(3)	IET 104 (Industrial Organization)	(3)	POL 101 (Introduction to Government)
(1)	ENGL 185 (Developmental Reading)	(3)	COM 114 (Fundamentals of Speech Communication)
(16)		(18)	

Process Option

SOPHOMORE YEAR

Third Semester

(3) CHT 273 (Introduction to the Physical Chemistry of Materials)
(4) CHT 252 (Industrial Chemistry: Quantitative)
(4) PHYS 220 (General Physics)
(3) MA 222 (Calculus for Technology II)
(3) CHT 201 (Unit Operations I)

(17)

Fourth Semester

(4) CHT 225 (Quantitative Analysis: Instrumental)
(3) GNT 220 (Technical Report Writing)
(3) CHT 202 (Unit Operations II)
(4) PHYS 221 (General Physics)
(3) SPV 252 (Human Relations in Industry)

(17)

CHEMISTRY

UNDERGRADUATE LEVEL

CHM 111. GENERAL CHEMISTRY. Class 2, Lab. 3, cr. 3. Open to all students not qualified for CHM 115.

CHM 112. GENERAL CHEMISTRY. Class 2, Lab. 3, cr. 3.

Continuation of CHM 111.

CHM 115. GENERAL CHEMISTRY. Class 3, Lab. 3, cr. 4. Required of students majoring in chemistry, physics, and engineering.

Laws and principles of chemistry, with special emphasis on topics of importance in engineering. Numerical problems and relationships are introduced whenever quantitative treatment is possible.

CHM 116. GENERAL CHEMISTRY. Class 3, Lab. 3, cr. 4.

A continuation of CHM 115.

CHM 119. GENERAL CHEMISTRY. Class 2, Lab. 3, cr. 3 or Class 4, Lab. 3, cr. 5. (Offered only in the Nurses' Training Program.)

A survey of general, organic, and biological chemistry. Intended primarily for students in the nursing program but may be taken by others with the consent of the instructor.

CHM 220. GENERAL CHEMISTRY. Class 2, Lab. 3, cr. 3. Prerequisite: CHM 116. Prerequisite or corequisite: MA 163 or equivalent. Required of students who have completed CHM 115 and 116 and who are planning to take 373.

A consideration of certain principles of general and analytical chemistry which are not covered in CHM 115 and 116. This course is designed to bridge the gap between the course sequences CHM 115-116 and 117-126.

CHM 223. INTRODUCTORY QUALITATIVE ANALYSIS. Class 2, Lab. 6, cr. 4. Prerequisite: CHM 112 or 116

Introduction to semimicro qualitative analysis for those whose requirements do not call for CHM 126.

CHM 224. INTRODUCTORY QUANTITATIVE ANALYSIS. Class 2, Lab. 6, Cr. 4. Prerequisite: CHM 112 or 116. Required of students majoring in biology who do not take CHM 321.

Introduction of titrimetric, gravimetric, and instrumental methods of analysis.

CHM 251. ORGANIC CHEMISTRY. Class 4, cr. 4. Prerequisite: CHM 112 or 116.

Introductory organic chemistry for students not expecting to take biochemistry. Emphasis on natural products, biochemical materials, and the theoretical principles relating the structures with the properties of organic compounds.

CHM 251L. ORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory experiments to accompany CHM 251.

CHM 255. ORGANIC CHEMISTRY. Class 3, cr. 3. Prerequisite: CHM 112 or 116.

A study of aliphatic and aromatic hydrocarbons and their simple derivatives in terms of (a) structure, bonding, etc., (b) general syntheses and reactions, and (c) a logical modern rationale for fundamental phenomena as supported by reactivity orders, orientation effects, stereochemistry, and relative rates.

CHM 255L. ORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory experiments to accompany CHM 255.

CHM 256. ORGANIC CHEMISTRY. Class 3, cr. 3. Continuation of CHM 255.

CHM 256L. ORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory experiments to accompany CHM 256.

CHM 261. ORGANIC CHEMISTRY. Class 3, cr. 3. Prerequisite: CHM 116.

A comprehensive study of the chemical principles underlying aliphatic and aromatic compounds. Emphasis is placed on the commercial and laboratory syntheses of these materials as well as their uses. Modern theory and stereochemistry are stressed to illustrate the logic inherent in the subject matter and to demonstrate the predictability of many of the chemical transformations discussed.

CHM 262. ORGANIC CHEMISTRY. Class 3, cr. 3. Prerequisite: CHM 261.

A continuation of CHM 261, but with a broader scope. The chemistry of a variety of functional groups is discussed. Theory is employed extensively to demonstrate the coherence underlying seemingly diverse transformations. Guest speakers, renowned for their research contributions to certain of the subjects discussed, present a limited number of lectures on these topics.

CHM 263L. ORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory experiments designed to illustrate the lecture material of CHM 261. Elementary laboratory techniques essential to organic chemistry are introduced followed by the actual synthesis and purification of compounds discussed in CHM 261.

CHM 264L. ORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

A continuation of CHM 263L in that the experiments are designed to illustrate principles discussed in CHM 262. A major portion of the course is devoted to methods employed in organic qualitative analysis. The student is expected to identify several "unknown" compounds and mixtures.

CHM 265L. ORGANIC CHEMISTRY LABORATORY. Lab. 6, cr. 2.

Similar to CHM 263L except that a larger number and more sophisticated organic syntheses are required. The preparations are designed, not only to illustrate the classical reactions discussed in CHM 261, but to allow for an extrapolation of the principles involved to other systems.

CHM 266L. ORGANIC CHEMISTRY LABORATORY. Lab. 6, cr. 2.

A continuation of CHM 265L. All experiments are designed to illustrate the principles discussed in CHM 262. A major portion of the course is devoted to the methods employed in organic qualitative analysis. The student is expected to identify "unknowns" and mixtures and is introduced to some modern instrumental techniques.

CHM 321. ANALYTICAL CHEMISTRY I. Class 2, Lab. 6, cr. 4. Prerequisites: CHM 126 or 220 and one year of organic chemistry. Required of students majoring in chemistry.

Quantitative measurements on complex chemical systems that show matrix effects or require isolation of a component prior to its determination; general approaches to quantitation problems at the trace level; critical comparisons of competitive procedures with emphasis upon principles of separation processes, including chromatography; recognition and elevation of possible sources of error; approaches for optimizing conditions so as to minimize time and/or efforts required to attain prescribed levels of accuracy and precision.

CHM 342. INORGANIC CHEMISTRY. Class 3, cr. 3. Prerequisite or corequisite: CHM 374.

Interpretation and correlation of inorganic reactions.

CHM 342L. INORGANIC CHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory work to accompany CHM 342.

CHM 373. PHYSICAL CHEMISTRY. Class 3, cr. 3. Prerequisites: CHM 126 or 220, MA 261, and two semesters of college physics.

Constitution of matter; general properties of gases, liquids, and solids; phenomena of solutions; special topics of electrochemistry, thermodynamics, thermochemistry, chemical statics and dynamics, chemical equilibrium, and the phase rule.

CHM 374. PHYSICAL CHEMISTRY. Class 3, cr. 3. Prerequisite: CHM 373.

Phase equilibria, liquids, electrolytic solutions and cells, structure of atoms and molecules, spectroscopy, chemical kinetics, the solid state.

CHM 374L. PHYSICAL CHEMISTRY LABORATORY. Lab. 6, cr. 2.

Laboratory portion of CHM 373 and 374.

CHM 424. ANALYTICAL CHEMISTRY II. Class 2, Lab. 6, cr. 4. Prerequisite: CHM 321; prerequisite or corequisite: CHM 374.

Principles and application of optical and electrical methods of chemical analysis, including topics in instrumentation.

CHM 499. SPECIAL ASSIGNMENTS. Lab. 3 to Lab. 15, cr. 1-5.

Special work, such as a senior thesis, not included in other courses.

DUAL LEVEL
Undergraduate-Graduate

CHM 513. CHEMICAL LITERATURE. Class 1, cr. 1.

Types of information in technical publications; exercises in finding, assembling and using such data.

CHM 533. INTRODUCTORY BIOCHEMISTRY. Class 3, cr. 3. Prerequisites or corequisites: CHM 224 and 256, or equivalent.

Chemistry and utilization in the living organisms of lipids, carbohydrates, proteins, enzymes, and hormones; physiological chemistry of the blood, urine, and other fluids and tissues; essentials of nutrition

CHM 534. INTRODUCTORY BIOCHEMISTRY. Class 3, cr. 3.

Continuation of CHM 533 with emphasis on enzymatic catalysis and metabolic transformations.

CHM 534L. BIOCHEMISTRY LABORATORY. Lab. 3, cr. 1.

Laboratory work to accompany CHM 533. If more laboratory work is desired, the student may register for CHM 530 at the same time.

CHM 548. RADIOCHEMISTRY. Class 2, cr. 2. Prerequisite: CHM 374 or equivalent.

Elements of nuclear chemistry; the uses of isotopes in chemical research; elementary principles of radiation chemistry.

CHM 548L. RADIOCHEMISTRY LABORATORY. Lab. 3, cr. 1. Prerequisite or corequisite: CHM 548.

Laboratory work to accompany CHM 548.

CHM 563. ORGANIC CHEMISTRY. Class 3, cr. 3. Prerequisite: elementary organic chemistry.

Ionic and free radical reactions are discussed critically with emphasis on the synthetic and mechanistic aspects of the reactions studied.

CHEMICAL TECHNOLOGY

UNDERGRADUATE LEVEL

CHT 109. GENERAL CHEMISTRY. Class 3, Lab. 3, cr. 4.

A one-semester general chemistry course intended for technology students.

CHT 201. UNIT OPERATIONS I. Class 3, cr. 3. Prerequisite: MA 150.

This course will acquaint the student with chemical process equipment, its use, and its applications. It focuses study on the principles, materials, systems of equipment, and some of the problems involved in chemical manufacturing processing. Chemical plant operations such as filtration, evaporation, drying, crystallization, solvent extraction, distillation and fluid handling are described and discussed.

CHT 202. UNIT OPERATIONS II. Class 3, cr. 3. Prerequisite: CHT 201.

A continuation of Unit Operations I.

CHT 212. INDUSTRIAL CHEMISTRY QUALITATIVE. Class 2, Lab. 6, cr. 4. Prerequisites: CHT 109 and MA 150 or equivalent.

Systematic semimicroanalysis with emphasis upon modern industrial techniques.

CHT 225. QUANTITATIVE ANALYSIS, INSTRUMENTAL. Class 3, Lab. 3, cr. 4. Prerequisite: CHT 252.

A continuation of the study of the chemical methods applied in quantitative analysis. Emphasis in this course is on oxidation-reduction reactions, precipitation titrimetry, and the analysis of multicomponent materials. The use of instrumental methods for performing analyses is introduced after the traditional methods have been covered. Emphasis will be upon application, limitations, and common errors in the methods, rather than upon the design, operation, and servicing of specific instruments.

CHT 251. ORGANIC CHEMISTRY. Class 4, Lab. 3, cr. 5.

A one-semester organic chemistry course intended for technology students.

CHT 252. INDUSTRIAL CHEMISTRY: QUANTITATIVE. Class 2, Lab. 6, cr. 4. Prerequisite: CHT 212.

An introduction to gravimetric, titrimetric, and potentiometric methods applicable to modern industrial practices.

CHT 273. PHYSICAL CHEMISTRY OF MATERIALS. Class 3, cr. 3.

An introductory treatment of the general properties of gases, liquids, and solids and the factors influencing them under extremes of temperature and pressure. This course is specifically designed for technology students.

PHARMACOLOGY

UNDERGRADUATE LEVEL

PCOL 201. INTRODUCTORY PHARMACY. Class 3, cr. 3.

An introduction to the pharmacological basis of therapeutics. Included are the study of the prescription, weights and measures, nomenclature, posology, dosage forms, therapeutic classifications and modes of administration. Factors which modify drug action will be discussed as well as contra-indications and drug reactions and their treatment. The relationship of the various members of the health team and their duties will be discussed.

BIOCHEMISTRY

UNDERGRADUATE LEVEL

BCHM 100. INTRODUCTION TO BIOCHEMISTRY. Class 2, Lab. 3, cr. 3. Prerequisite: CHM 119 or equivalent.

A survey of modern biochemistry using descriptions of contemporary experiments to illustrate the general theories and unifying concepts. Open to all students.

CIVIL ENGINEERING TECHNOLOGY—See Department of Construction Technology

COMPUTER SCIENCES—See Department of Mathematical Sciences

DEPARTMENT OF COMPUTER TECHNOLOGY

A. J. Adams, Acting Head

FACULTY: A. J. Adams, D. R. Kurtz, J. Maniotes, J. S. Quasney, S. Rados (Radosavljevic)

ASSOCIATE IN APPLIED SCIENCE DEGREE

Admission Requirements

Persons desiring to enter the Computer Technology program must submit an application for admission before registering for classes. Applications may be secured by writing or calling the Admissions Office, Purdue University Calumet Campus, Hammond, Indiana. 844-0520, ext. 214.

Beginning applicants seeking regular admission status must have graduated in the top ⅔ of their high school class and have completed the following subjects:

1 year Algebra
1 year Plane Geometry
3 years English
1 year Science
1 year Social Science
— other units of study that total at least 15 units of credit.

In addition the results of the C.E.E.B. scholastic aptitude tests must be submitted.

Transfer applicants are expected to have earned at least a "C" average in their previous college course work and meet the minimum subject matter requirements listed above.

All applicants not meeting the above requirements may enroll in a pre-technology program of studies that will allow the student to acquire the additional background and preparation necessary to later gain regular admission in Computer Technology.

Adults who wish to take advantage of computer technology courses without undertaking a degree plan of study may enroll as a non-degree student. Such applicants are not required to submit transcripts or test scores.

Program Description

This two-year Associate degree program is designed to produce a graduate in the occupational group that begins with the computer programmer.

This curriculum is designed to prepare a person able to perform the following functions: analyze problems initially presented by a systems analyst with respect to the type and extent of commercial or scientific data to be processed, the method of processing to be employed, and the format and extent of the final results. Design detailed flowcharts and computer programs giving the computations involved and the sequences of computer and other machine operations necessary to edit and input the data, process it, and edit and output information. Correct program errors and determine the causes of machine stoppage. Verify the accuracy and completeness of computer programs by preparing sample data and testing it on the computer. Evaluate and modify existing programs to take into account changed requirements. Confer with technical personnel with respect to planning new or altered programs. Prepare full documentation with respect to procedures on the computer and other machines and on the content of the computer programs and their full usage. Devise more efficient methods for the solution of commercial or scientific problems. Comprehend the major concepts, types of equipment, and programming systems related to electronic data processing. Be familiar with common commercial and business

procedures or with common scientific and engineering procedures. Those who wish may continue on with the Baccalaureate program without loss of time, credit or change of direction.

Plan of Study

FRESHMAN YEAR

First Semester		Second Semester	
(5)	CPT 115 (Introduction to Data Processing)*	(3)	CPT 122 (Computer Math)
(3)	ENGL 104 (English Composition I)	(3)	CPT 261 (RPG Programming)
(3)	INDM 200 (Introductory Accounting)	(3)	CPT 264 (FORTRAN Programming)
(3)	MA 147 (Algebra and Trigonometry for Technology I)	(3)	INDM 201 (Cost Accounting)
(3)	Elective	(3)	MA 148 (Algebra and Trigonometry for Technology II) or Elective
(17)		(15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	CPT 133 (Assembly Language Programming I)	(4)	CPT 134 (Assembly Language Programming II)
(3)	CPT 225 (Statistical Methods)	(3)	CPT 286 (Computer Operating Systems I)
(3)	CPT 252 (Systems Analysis and Design)	(1)	CPT 294 (Data Processing Seminar)
(3)	CPT 265 (COBOL Programming)	(3)	CPT 254 (Commercial Systems Applications)
(3)	COM 114 (Fundamentals of Speech Communication)	(3)	ECON 210 (Principles of Economics)
		(3)	ENGL 220 (Technical Report Writing)
(16)		(17)	

(65) Total Credits

BACHELOR OF SCIENCE DEGREE

Introduction

This Baccalaureate program is a two-year "add-on" curriculum which is open to Associate degree graduates of Computer Technology.

The program builds on the student's knowledge of computer programming acquired in the first two years and emphasizes the practical aspects of computer systems design and commercial systems analysis. The inclusion of many elective courses enables the students to pursue areas of special interest.

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* In the evening, CPT 115 is offered as two courses:
CPT 116 Introduction to Data Processing I 3 Credits
CPT 117 Introduction to Data Processing II 3 Credits

Graduates are prepared to fill a variety of positions related to data processing, computer systems, and computer programming.

General Requirements

1. Completion of an Associate in Applied Science Degree, in Computer Technology or the equivalent.
2. Completion of the Core Requirements, plus additional courses as required to complete a minimum of 130 semester credit hours which includes credits earned toward the Associate Degree. The additional courses are free electives, except that not more than 9 semester credit hours may be taken in the Computer Technology Department.
3. A minimum of 40 semester credit hours must be 300 or higher level courses.

Core Requirements (109-111 Hours)

	Semester Credit Hours
1. General Education	
Communications (English, Speech, Report Writing)	12
Social Science (Economics, Political Science, Psychology, Sociology)	9
Humanities (Creative Arts, History, Literature, Philosophy)	6
Business (Industrial Management, Industrial Supervision)	9
Mathematics (Including Calculus, Finite Mathematics and Statistics)	17
Physical Science (Biology, Chemistry, Physics)	8
	61
2. Computing Principles	
Data Processing Basics (CPT 115, 294)	6
Assembly Languages (CPT 131, 132 or CPT 133, 134)	6-8
Compiler Languages (CPT 264, 265, 360)	9
Computer Systems (CPT 286, 340)	6
	27-29
3. Computer Concentration Courses	21

Any two of the following sequences plus one additional computer-oriented course make up the computer concentration.

Commercial systems: CPT 354, 454; INDM 300

Computer systems analysis: CPT 380, 480; CS 542

Systems programming: CPT 386, 468; CS 402

Technical systems: CPT 320, 364, 444

Plan of Study

JUNIOR YEAR

Fifth Semester

(3) CPT 340 (Data Communications)
(6) Computer concentration
(3) MA 221 (Calculus for Technology I)†
(3) Communication elective
(2) Elective

(17)

Sixth Semester

(3) CPT 360 (PL/1 Programming)
(3) Computer concentration
(3) MA 222 (Calculus for Technology II)†
(4) Physical science elective†
(3) Elective

(16)

SENIOR YEAR

Seventh Semester

(6) Computer concentration
(4) Physical science elective†
(3) Social science elective
(3) Humanities elective

(16)

Eighth Semester

(6) Computer concentration
(3) Social science elective
(3) Humanities elective
(4) Electives

(16)

Pass/Not Pass Policy

No student will be permitted to choose the pass/not pass option for any CPT (Computer Technology) prefix courses.

For non-CPT courses, no student will be permitted to choose the pass/not pass option until the student's adviser is in agreement that this appears to be a desirable course for the student to pursue in this particular situation.

COMPUTER TECHNOLOGY

PERSONAL SERVICE COURSES

Students successfully completing personal service courses numbered 1 through 90 earn certificate units and not University credit.

CPT 64. INTRODUCTION TO COMPUTER PROGRAMMING. Class 1, Lab. 1, cert. units 1.
The writing of programs to solve problems on the computer in the language FORTRAN. The laboratory period is used to process programs through the computer.

UNDERGRADUATE LEVEL

Lower-Division Courses

CPT 100. COMPUTER UTILIZATION. Class 3. cr. 3.
An introduction to data processing techniques through the use of unit record and high-speed computer equipment. Emphasis will be on how computers can assist the potential user.

CPT 115. INTRODUCTION TO DATA PROCESSING. Class 4, Lab. 2, cr. 5. Not open to students with credit in CPT 116 or CPT 117.

† Technical option graduates substitute following sequence:
CPT 265 (COBOL Programming)
Business electives (2)
Elective

An introduction to computers and data processing. The historical development of unit record equipment and electronic digital computers; an introduction to unit record equipment, machine language, assembly language, compiler languages; and a survey of computer applications.

CPT 116. INTRODUCTION TO DATA PROCESSING I. Class 3, cr. 3. CPT 116-117 is a two semester version of CPT 115. Not open to students with credit in CPT 115.

CPT 117. INTRODUCTION TO DATA PROCESSING II. Class 2, Lab. 2, cr. 3. Continuation of CPT 116. Not open to students with credit in CPT 115.

CPT 122. COMPUTER MATH. Class 3, cr. 3. Prerequisite: MA 147 or MA 150.

Selected topics in mathematics that are related to business and computer computations. Topics include symbolic logic; binary, octal, and hexadecimal number systems; determinates; matrices; and linear systems.

CPT 133. ASSEMBLY LANGUAGE PROGRAMMING I. Class 3, Lab. 2, cr. 4. Prerequisite: CPT 115 or CPT 116.

Programming of a digital computer at the machine language and assembly language levels with emphasis on the meticulous step by step development of a program. Topics include: computer hardware, stored program concepts, operation codes, addresses, flow diagrams and assembly language translators. In the laboratory, students write, process, and debug programs using the computer on an open shop basis.

CPT 134. ASSEMBLY LANGUAGE PROGRAMMING II. Class 3, Lab. 2, cr. 4. Prerequisite: CPT 131 or 133.

Advanced symbolic programming techniques, programming exercises, and case studies are designed to familiarize the student with actual programming practices and to bridge the gap from the theoretical to the real world of data processing.

CPT 198. DATA PROCESSING PRACTICE I. Cr. 1.

Practice in industry with written reports of this practice for co-op students. May be repeated once.

CPT 200. COMPUTER PROGRAMMING FUNDAMENTALS. Class 2, Lab. 2, cr. 3.

The presentation of the basic elements of programming digital computers. There is a treatment of absolute and symbolic coding, magnetic tape functions, and random access processing. Major emphasis will be on compiler language (FORTRAN) programming.

CPT 220. NUMERICAL METHODS. Class 2, Lab. 2, cr. 3. Prerequisites: CPT 264 and MA 221.

Numerical methods necessary for finding solutions to mathematical equations and for analysis of tabulated data. A laboratory course consisting chiefly of the solution of specific problems by computer programming and other methods. Topics include: iterative and direct solutions of linear equations, matrix operations, integration techniques, and error analysis.

CPT 225. STATISTICAL METHODS. Class 3, cr. 3. Prerequisite or corequisite: CPT 264.

An introduction to elementary statistics with emphasis on the analysis of actual data. Topics include: description and representation of sample data, probability, theoretical distributions, sampling, estimating, correlation, regression, and computer statistical routines.

CPT 252. SYSTEMS ANALYSIS AND DESIGN. Class 3, cr. 3. Prerequisite: CPT 115.

This course introduces the programmer to the procedural requirements of the system cycle. Through actual problem solution, the student is introduced to the techniques of system planning, analysis, form and file design, documentation, implementation and evaluation.

CPT 254. COMMERCIAL SYSTEMS APPLICATIONS. Class 3, cr. 3. Prerequisites: CPT 131 or 133, IET 104, INDM 200.

An introduction to commercial data processing principles and practices as related to computer-oriented systems. A study of the basic concepts, flowcharting, forms design, and writing of procedures for the major application areas including payroll, accounts receivable, accounts payable, and inventory control.

CPT 261. RPG PROGRAMMING. Class 2, Lab. 2, cr. 3.

Computer programming using RPG, Report Program Generator. Study of the language structure, applications, and related utility programs.

CPT 264. FORTRAN PROGRAMMING. Class 2, Lab. 2, cr. 3. Prerequisite: CPT 131 or 133. Prerequisite or corequisite: CPT 122.

The structure and details of FORTRAN, a mathematically oriented compiler language. Numerous problems are solved on the computer to demonstrate the many facets of the language.

CPT 265. COBOL PROGRAMMING. Class 2, Lab. 2, cr. 3. Prerequisite: A prior programming course.

A study of the programming language, COBOL, which is oriented toward data handling and processing tasks. The student will study the structure and details of COBOL and perform programming exercises as well as consider practical applications.

CPT 286. COMPUTER OPERATING SYSTEMS I. Class 2, Lab. 2, cr. 3. Prerequisites: CPT 132 or 134, and CPT 264.

An introduction to the computer operating systems and other systems software. Topics include: utility programs, job control monitors, program supervisors, loaders and linkeditors.

CPT 288. DATA STORAGE AND ACCESS METHODS. Class 3, cr. 3. Prerequisite: CPT 133.

File-handling topics (emphasis on common data bases and large disk files) in regard to the mechanical efficiency of file organization including input/output control systems, overlapped input/output, data channels, data storage structures, blocking, chaining, hooking, data areas, file reorganization, timing considerations, and data base organization.

CPT 290. COMPUTER PROJECT. Cr. 1-4.

Independent study for sophomore students who desire to execute a complete computer-oriented project. Course may be repeated for credit up to six hours.

CPT 294. DATA PROCESSING SEMINAR. Class 2, cr. 1. Prerequisite: An introductory computer course.

Current problems and issues in the computer field. Field trips are required.

CPT 298. DATA PROCESSING PRACTICE II. Cr. 1.

Practice in industry with written reports of this practice for co-op students. May be repeated once.

CPT 299. COMPUTER TECHNOLOGY. Cr. 1-4.

Hours, credit and subject matter to be arranged by staff. May be repeated for credit up to nine hours.

UNDERGRADUATE LEVEL
Upper-Division Courses

CPT 300. INTRODUCTION TO COMPUTERS. Class 3, cr. 3.

A broad survey of computers, data processing, and applications. Punched cards preparation, unit record equipment, computer hardware, and programming principles and languages. Applications emphasize how the computer is used as a tool to assist the user.

CPT 320. NUMERICAL METHODS II. Class 3, cr. 3. Prerequisites: CPT 220 and MA 222.

A continuation of CPT 220. Topics include: finite difference calculus, finite difference equations, differentiation techniques, and error analysis applied to these techniques.

CPT 340. DATA COMMUNICATIONS. Class 3, cr. 3. Prerequisite: CPT 132 or 134.

The role of data communications in modern computation. Real time systems and data transmission. Topics include: terminal equipment, communication media, data codes, error detection and correction, and terminal software.

CPT 345. COMPUTER GRAPHICS. Class 2, cr. 2. Prerequisite: An introductory computer course.

A survey of computer hardware used to make graphic displays including printer, plotter, and cathode rays tube. Programming techniques for plotting lines and special symbols, the organization and representation of data, and a survey of applications.

CPT 354. MANAGEMENT INFORMATION SYSTEMS I. Class 2, Lab. 2, cr. 3. Prerequisites: CPT 254 and 265.

The processing of data in an integrated management information system environment with emphasis on the source, flow, dissemination, and interrelationship of data required for various operational areas of an industrial organization. The laboratory period is used for programming (in COBOL) and documentation of practical problems in management information systems.

CPT 360. PL/1 PROGRAMMING. Class 3, cr. 3. Prerequisites: CPT 264 and CPT 265.

Detailed study of the PL/1 programming language and comparison of the language with COBOL and FORTRAN. Students will program representative ap-

plications in the PL/1 programming language.

CPT 364. TOPICS IN FORTRAN. Class 3, cr. 3. Prerequisites: CPT 264 and MA 222.

A continuation of CPT 264. Dialects of FORTRAN with emphasis on FORTRAN IV, FORTRAN compilers, computational methods, and applications in various technical and commercial areas.

CPT 365. TOPICS IN COBOL. Class 3, cr. 3. Prerequisite: CPT 265.

Advanced COBOL topics concerning index-sequential files, direct files, sophisticated table handling employing subscripting and indexing, preprocessor use, simulation, and subprogram use.

CPT 367. APL PROGRAMMING. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3. Prerequisites: CPT 264 and MA 222.

Computer programming using APL, A Programming Language (Iverson). Study of the language structure and applications.

CPT 380. SYSTEMS ANALYSIS OF COMPUTER APPLICATIONS. Class 3, cr. 3. Prerequisite: CPT 254.

Total computerization of various applications. Case studies will be used to enforce those systems analysis techniques presented.

CPT 386. COMPUTER OPERATING SYSTEMS II. Class 2, Lab. 2, cr. 3. Prerequisite: CPT 286.

A continuation of CPT 286 with emphasis on systems generation, control languages, and time-sharing.

CPT 396. COMPUTER LABORATORY. Lab. 1-6, cr. 1-2.

Applied computer laboratory experiences carried out on an independent study basis in conjunction with other courses, assignments, or problems.

CPT 398. DATA PROCESSING PRACTICE III. Cr. 1.

Practice in industry with written reports of this practice for co-op students. May be repeated once.

CPT 444. HYBRID COMPUTING SYSTEMS. Class 2, Lab. 2, cr. 3. Prerequisite: CPT 340.

A study of analog and hybrid computing systems. Topics will include: analog to digital and digital to analog conversion, process control systems, realtime monitoring.

CPT 454. MANAGEMENT INFORMATION SYSTEMS II. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3. Prerequisite: CPT 354.

A continuation of the material presented in CPT 354, including topics in operations research.

CPT 460. PROGRAMMING SYSTEMS. Class 3, cr. 3. Prerequisites: CPT 264, CPT 265, CPT 360.

A broad overview of some basic and advanced concepts in higher level languages and their design. Emphasis is on issues and breadth rather than on details. Topics cover basic characteristics of programming languages, formal methods of defining syntax and semantics, broad language areas of string and list processing, formula manipulation, on-line commands, simulation, concepts of languages for specialized application areas and for program validation, and current research topics and technical issues.

CPT 480. COMPUTER SYSTEM PLANNING. Class 3, cr. 3. Prerequisites: CPT 354 and INDM 360.

The planning and design of computer systems, including the formulation of corporate requirements, configuration of hardware to satisfy stated requirements, comparison and evaluation of equipment, installation considerations, and implementation procedures.

CPT 486. SYSTEMS PROGRAMMING. Class 2, Lab. 2, cr. 3. Prerequisite: CPT 386.

Programming and maintenance of software packages. Software areas to be covered include operating systems, subroutine sets, assemblers and compilers, microprogramming.

CPT 490. SENIOR PROJECT. Cr. 1-4.

Independent study for seniors who desire to execute a complete computer oriented project. Course may be repeated for credit up to six hours.

CPT 498. DATA PROCESSING PRACTICE IV. Cr. 1.

Practice in industry with written reports of this practice for co-op students. May be repeated once.

CPT 499. COMPUTER TECHNOLOGY. Cr. 1-4.

Hours, credit, and subject matter to be arranged by staff. May be repeated for credit up to six hours.

DEPARTMENT OF CONSTRUCTION TECHNOLOGY

Charles J. McAllister, Head

FACULTY: R. E. Bennett, E. A. Dudek, C. R. Hutton, C. J. McAllister, B. M. Meeker, N. G. Scarlatis, G. R. Sullivan, S. Truchan, Jr.

The Department of Construction Technology offers two 2-year Associate in Applied Science (A.A.S.) degrees, one in Architectural Technology, and another in Civil Engineering Technology. Upon completion of either of these degrees, the student may choose to complete the third and fourth years for the Bachelor of Science degree in Construction Technology.

Admissions Criteria

Acceptance as a new student in the University is influenced by many factors. The Admissions Committee is guided by the following:

1. Graduation from a high school accredited by a state Department of Public Instruction.
2. The extent to which the applicant meets or exceeds minimum subject matter requirements. Almost all applicants far exceed the minimum requirements which are indicated in the table below. For admission to the construction technology curriculum, the record must include:

Subjects	Number of Semesters
Algebra	2
Geometry	2
Laboratory science	2
English	6
History or social studies	2

Pass/Not Pass Option

No student will be permitted to choose the pass/not pass option until the student's adviser is in agreement that this appears to be a desirable course for the student to pursue in this particular situation.

A.A.S. DEGREE IN ARCHITECTURAL TECHNOLOGY

This curriculum is designed to prepare students for technological employment with contractors, building materials suppliers, architects, civil engineers, and related governmental agencies.

Graduates of this two year Program are prepared to accept positions as estimators, expeditors, planning technicians, field inspectors, architectural detailers, architectural draftsmen, and sales representatives. With experience, after completing this program of study, graduates are now holding positions as field engineers, technical engineers, junior structural engineers, engineering assistants, shop superintendents, and real estate brokers. This field of specialization is well designed to help the student who is interested in going into the construction business for himself. *Graduates may also continue their education by pursuing a Bachelor of Science degree in construction technology.*

FRESHMAN YEAR

First Semester

(2) ART 116 (Construction Drafting)
(2) ART 120 (Freshman Drawing)
(2) ART 172 (Systems of Construction)
(3) ENGL 104 (English Composition)
(3) MA 147 (Algebra and Trignometry)
(3) Social sciences elective

(15)

Second Semester

(2) ART 220 (Freehand Drawing)
(3) ART 150 (Architectural Construction I)
(3) CET 104 (Elementary Surveying)
(3) CET 160 (Statics)
(3) MA 148 (Algebra and Trignometry)
(2) ART 164 (Building Materials)

(16)

SOPHOMORE YEAR

(3) COM 114 (Speech)
(3) ART 222 (Architectural Construction II)
(2) ART 276 (Specifications)
(3) ART 284 (Mechanical Equipment for Buildings)
(3) CET 262 (Strength of Materials I)
(4) PHYS 218 (General Physics)

(18)

Fourth Semester

(3) ART 224 (Architectural Construction III)
(3) CNT 280 (Quantity Survey and Estimating)
(2) ART 285 (Electricity for Buildings)
(3) CET 264 (Strength of Materials II)
(3) ENGL 220 (Technical Report Writing)
(3) ART 210 (History of Architecture I)

(17)

A.A.S. DEGREE IN CIVIL ENGINEERING TECHNOLOGY

An ECPD accredited engineering technology curriculum

This program is designed to prepare students for employment with land surveyors, highway departments, contractors, city engineering offices, railroads, and engineering consultants, as well as in other specializations of civil engineering technology.

Graduates of this two year program accept positions as technicians in the offices of contractors, city engineers, and professional engineers; as topographers, structural draftsmen, and steel and concrete laboratory technicians; and as instrument men with land surveys, property surveys, and highway surveys. With additional experience students may acquire positions as supervisors, or chiefs of parties, in a variety of work associated with civil engineering.

Graduates may also continue their education by pursuing a Bachelor of Science degree in construction technology.

FRESHMAN YEAR

First Semester

(2) ART 116 (Construction Drafting)
(2) ART 164 (Building Materials)
(3) ENGL 104 (English Composition)
(3) MA 147 (Algebra and Trignometry)
(3) Social science elective
(3) Business elective

(16)

Second Semester

(3) CET 104 (Elementary Surveying)
(3) CET 160 (Statics)
(3) ART 150 (Architectural Construction I)
(3) MA 148 (Algebra and Trignometry)
(4) PHYS 218 (General Physics)

(16)

SOPHOMORE YEAR

Third Semester

(3) CET 108 (Route Surveying and Design)
(3) CET 253 (Hydraulics and Drain)
(3) CET 262 (Strength of Materials I)
(2) ART 276 (Specifications)
(3) MA 221 (Calculus for Technology)
(3) Nontechnical elective

(17)

Fourth Semester

(3) CET 209 (Land Surveying and Subdivision)
(3) CET 264 (Strength of Materials II)
(3) CET 280 (Structural Calculations)
(3) CNT 280 (Quantity Survey and Estimating)
(3) MA 222 (Calculus for Technology)
(3) COM 114 (Speech)

(18)

B.S. DEGREE IN CONSTRUCTION TECHNOLOGY

An ECPD accredited engineering technology curriculum

This baccalaureate program is open to students with an Associate in Applied Science degree in architectural technology, civil engineering technology, or the equivalent. It is an extension of the associate degree program with emphasis on the principles and practices of construction, further development of the technical courses of the associate degree program, an introduction to the principles of business and management, and additional training in written and verbal communications.

Graduates of the program find employment with contractors, architects, consulting engineers, building product companies, or governmental organizations. Experienced graduates may be employed in a wide variety of occupational areas such as contracting, detailing, drafting, estimating, inspecting, merchandising, supervising, and testing. This curriculum is not designed to prepare students for registration as professional architects or engineers.

JUNIOR YEAR

Fifth Semester

(4) CNT 441 (Construction Operations)
(3) CPT 200 (Computer Programming Fundamentals)
(3) Technical elective
(3) Elective
(3) Business elective

(16)

Sixth Semester

(3) CNT 344 (Construction Inspection)
(3) ART 476 (Specifications II)
(3) SPV 374 (Industrial Supervision)
(3) Technical elective
(3) Elective
(3) Nontechnical elective

(18)

SUMMER SEMESTER

(1) CNT 390 (Construction Experience)

SENIOR YEAR

Seventh Semester

(2) CNT 340 (Construction Scheduling)
(2) ART 490 (Senior Project)
(3) COM 315 (Communication of Technical Information)
(3) Technical elective
(3) Elective
(3) Nontechnical elective

(16)

Eighth Semester

(3) CNT 442 (Construction Cost and Bidding)
(4) ART 490 (Senior Project)
(3) COM 415 (Communication of Technical Information)
(3) Business elective
(3) Elective

(16)

TECHNICAL ELECTIVES

For ART associate degree graduates: ART 310, 360, 362
For CET associate degree graduates: CET 382, 384, 386

ARCHITECTURAL TECHNOLOGY

ART 116. CONSTRUCTION DRAFTING. Lab. 6, cr. 2.

Introduction to drafting fundamentals with emphasis on architectural and civil engineering topics. Use of instruments, lettering, orthographic projection, auxiliary views, intersections, perspective, and working drawings.

ART 118. ARCHITECTURAL PROJECTIONS. Lab. 6, cr. 2.

Introduction to projection, intersections, shading and shadows, and perspective drawing.

ART 120. FREEHAND DRAWING I. Lab. 6, cr. 2.

Development of freehand sketching, using pencil, charcoal and ink, as a means of communication with an emphasis on architectural subjects.

ART 150. ARCHITECTURAL CONSTRUCTION I. Lab. 9, cr. 3. (Evening Divisions: Lab. 6, cr. 3, with outside assignments required.) Prerequisite: ART 116 or EG 110.

A study of wood frame construction through a semester project requiring planning, preliminary drawings, and a model of the framing system. Field trips may be included.

ART 162. BUILDING MATERIALS AND METHODS. Class 1, Lab. 3, cr. 2.

Properties and use of various building materials in modern construction, and an

introduction to the skills and methods related to their erection.

ART 164. BUILDING MATERIALS. Class 2, cr. 2.
Properties and use of materials as found in building construction.

ART 172. SYSTEMS OF CONSTRUCTION. Class 2, cr. 2.
A survey of the organization of the construction industry, and introduction to various building components and systems with emphasis on a non-mathematical study of structural systems.

ART 204. BUILDING REGULATIONS. Class 2, cr. 2.
Building codes, ordinances, and regulations, with emphasis on those for structures in Indiana.

ART 210. HISTORY OF ARCHITECTURE I. Class 3, cr. 3.
Survey of styles and influences of cultures which led to the development of architecture from the earliest times to the present day.

ART 220. FREEHAND DRAWING II. Lab. 6, cr. 2.
Continuation of ART 120. The study of color theory and the use of color techniques in architectural presentations.

ART 222. ARCHITECTURAL CONSTRUCTION II. Lab. 9, cr. 3. (Evening Divisions: Lab. 6, cr. 3, with outside assignments required.) Prerequisite: ART 150.
Preparation of preliminary and working drawings for an intermediate-sized commercial or institutional building.

ART 224. ARCHITECTURAL CONSTRUCTION III. Lab. 9, cr. 3. (Evening Divisions: Lab. 6, cr. 3, with outside assignments required.) Prerequisite: ART 222.
Continuation of ART 222 with emphasis on larger and more complex structures.

ART 276. SPECIFICATIONS AND CONTRACT DOCUMENTS. Class 2, cr. 2.
Preparation of general conditions and major phases of building construction specifications, study agreements, contracts, liens, and bonds.

ART 284. MECHANICAL EQUIPMENT OF BUILDINGS. Class 3, cr. 3.
A study of plumbing, heating and air-conditioning for residential and commercial buildings. Water supply and drainage systems, heat loss and heat gain, heating systems, and air-conditioning systems.

ART 285. ELECTRICITY FOR BUILDINGS. Class 2, cr. 2.
A survey of electrical and lighting requirements for residential and commercial buildings. Lighting fundamentals and design, electric circuits, power requirements, and wiring layout.

ART 299. ARCHITECTURAL ENGINEERING TECHNOLOGY. Cr. 1-4.
Hours and subject matter to be arranged with staff. Course may be repeated up to 9 hours.

ART 310. HISTORY OF ARCHITECTURE II. Class 3, cr. 3. Prerequisite: ART 210.
A survey of architectural developments of the nineteenth and twentieth centuries.

ART 341. ARCHITECTURAL DESIGN I. Class 1, Lab. 5, cr. 3. Prerequisite: ART 224.
Planning, development, and architectural delineation of small structures with pencil, charcoal, and water colors.

ART 342. ARCHITECTURAL DESIGN II. Class 1, Lab. 5, cr. 3. Prerequisite: ART 341.
Continuation of ART 341 with emphasis on larger and more complex structures.

ART 360. COMMUNITY PLANNING I. Class 2, Lab. 3, cr. 3.
A study of planning methods, legislation, and agencies. Emphasis on collection of data about an existing community and the preparation of land-use maps from that data.

ART 362. COMMUNITY PLANNING II. Class 1, Lab. 6, cr. 3. Prerequisite: ART 360.
Application of planning methods to the development of a new community or the redevelopment of an existing community.

ART 460. REAL ESTATE. Class 3, cr. 3.
A study of the legal aspects and practices of the real estate business, including appraising, finance, property management, and land development.

ART 476. SPECIFICATIONS. Class 3, cr. 3.
Expansion of the general principles of construction documents covered in ART 276. Detailed study of purpose and intent of specifications. Preparation of various sections or specifications for specific

jobs, including: development of the general conditions, adaptation of selected provisions from standard specifications, and delineation of special supplemental conditions.

ART 490. SENIOR PROJECT. Cr. 1-6.
Final project aimed at combining the skills and knowledge gained from the various areas of studies. The student will be expected to report graphically, orally, and in written form on a final project approved by the adivsor. Presentation will be made to a representative board of the faculty determined by the advisor.

ART 499. ARCHITECTURAL TECHNOLOGY. Cr. 1-4.
Hours, subject matter and credit to be arranged with staff. Course may be repeated for credit up to 9 hours.

CIVIL ENGINEERING TECHNOLOGY

CET 100. TECHNICAL COMPUTATIONS. Class 3, cr. 3.
A study of elements from algebra and trigonometry appropriate to surveying, and of related computational methods including: slide rule, logarithms, calculator and computer.

CET 104. ELEMENTARY SURVEYING. Class 2, Lab. 3, cr. 3. Prerequisite or corequisite: MA 112, MA 150 or equivalent.
Measurement of distances, directions and angles, using the tape, level, compass and transit. Computation of areas and traverses, lines and grades.

CET 108. ROUTE SURVEYING AND DESIGN. Class 1, Lab. 6, cr. 3. Prerequisite: CET 104.
Preliminary and construction surveys for route location. Calculation and field work for simple and easement curves, grade lines, and slope stakes. Preparation of plans, profiles, and cross-sections from field survey data. Earth-work estimates.

CET 160. STATICS. Class 3, cr. 3. Prerequisite: MA 154 or equivalent.
Study of force action on bodies at rest. Coplanar and non-coplanar forces, concurrent and non-concurrent forces, friction forces, hydrostatic forces, controids and moments of inertia, will be studied. An introduction to dynamic forces will be included.

CET 208. ROUTE SURVEYING. Class 1, Lab. 3, cr. 2. Prerequisite: CET 104.
Preliminary and construction surveys for highways and railroads, including simple compound, reverse, and easement curves, super-elevation of curves, profiles, grade lines, slope stakes, yardage estimates and mass and haul diagrams.

CET 209. LAND SURVEYING AND SUBDIVISION. Class 1, Lab. 6, cr. 3. Prerequisite. CET 104.
Theory and practice of land surveying, subdivision, filing and recording deeds, United States government survey of public lands, laws of land surveying, descriptions and area computations for land surveys. Subdivision planning, calculations and plotting, water main layouts, storm and sanitary sewer calculations and layouts. Street plans and profiles.

CET 253. HYDRAULICS AND DRAINAGE. Class 3, cr. 3. Prerequisite: MA 150.
Basic hydrostatics, Bernouilli's equation, flow in water and sewer lines, overland and ditch drainage, and culvert size determination.

CET 260. STRENGTH OF MATERIALS. Class 3, cr. 3. Prerequisite: CET 160.
Study of stress-strain relationships, shear and bending moment diagrams, stresses and deflections of beams axial loads, and combined stresses. Applied problems in the field of structural design.

CET 262. STRENGTH OF MATERIALS I. Class 2, Lab. 3, cr. 3. Prerequisite: CET 160.
Study of stress-strain relationships of construction materials, connections, and shear and moment diagrams. Testing of materials to determine physical and mechanical properties.
The sequence CET 262-264 fulfills the requirement of CET 260-266.

CET 264. STRENGTH OF MATERIALS II. Class 2, Lab. 3, cr. 3. Prerequisite: CET 262.
A study of bending stresses, beam deflections, column behavior, and combined stresses as applied to symmetric structural

members. Tests of beams and columns to measure load-deflection relationships.

CET 266. MATERIALS TESTING. Class 1, Lab. 6, cr. 3. Prerequisite: CET 260.
Testing of construction materials to determine physical and mechanical properties. Preparation of reports from data secured from such tests.

CET 280. STRUCTURAL CALCULATIONS. Class 3, cr. 3. Prerequisite: CET 260.
Practice in the calculation of loads, reactions, shear, and moment for determinate structures. Introduction to indeterminate structures with emphasis on moment-distribution.

CET 281. APPLIED STRUCTURAL DESIGN. Class 1, Lab. 6, cr. 3. Prerequisite: CET 260.
Standard design procedures for steel and wood frame structures. Computation of loads, shears, moments and deflections. Sizing of beams, columns, and connections. Preparation of structural drawings.

CET 282. STRUCTURAL DETAILING. Class 1, Lab. 6, cr. 3. Prerequisites: CET 260 and ART 150.
Detailing simple structural steel, reinforced concrete and wood structures, elementary design principles.

CET 299. CIVIL ENGINEERING TECHNOLOGY. Cr. 1-4.
Hours to be arranged with the staff. Primarily for third and fourth semester students. Subject matter to be assigned by the staff.

CET 366. MATERIALS TESTING II. Class 1, Lab. 6, cr. 3. Prerequisite: CET 266.
An introduction to testing structural elements and complete structures. Strain gauge measurements, instrumentation, and the design of tests to eliminate variables. Statistical analysis of text data.

CET 368. EXPERIMENTAL STRESS ANALYSIS LAB. Class 1, Lab. 3, cr. 2. Prerequisite: CET 266.
Introduction to and application of the use of electrical strain gages, brittle lacquers and photoelastic means of determining location, direction and magnitude of strains in scale and full-size structural systems and components.

CET 380. STRUCTURAL DESIGN STANDARDS. Class 3, Lab. 3, cr. 4. Prerequisite: CET 280.
Standard design procedures for the selection of steel, concrete and wood members, including shear, moment, and compression criteria, with emphasis on the limitations of these procedures.

CET 382. STEEL CONSTRUCTION. Class 2, Lab. 3, cr. 3. Prerequisite: CET 280.
Design of steel framed structures, including beams, columns, and connections. The preparation of structural drawings, and a study of erection practices.

CET 384. WOOD CONSTRUCTION. Class 2, Lab. 3, cr. 3. Prerequisite: CET 280.
Design of wood frame construction and the framework for concrete construction, including the preparation of structural and construction drawings.

CET 386. REINFORCED CONCRETE CONSTRUCTION. Class 4, cr. 4. Prerequisite: CET 280.
A study of concrete both as a construction material and as a structural material. Field methods and practices used in concrete construction. Fundamentals of reinforced concrete design as applied to beams, slabs, columns, walls, and footings.

CET 408. CONSTRUCTION OF HIGHWAYS. Class 1, Lab. 3, cr. 2. Prerequisites: CET 108 and CET 431.
Materials, design and construction methods used in asphalt and concrete pavements. Preliminary layout and design of intersections. Design and construction of highway subgrades.

CET 409. PROPERTY SURVEYING. Class 2, Lab. 3, cr. 3. Prerequisite: CET 209.
Office and field work associated with land surveying. Laws of land surveying, and public records of real property. Metes and bounds, Federal subdivision, and state plane coordinate descriptions.

CET 431. PROPERTIES AND BEHAVIOR OF SOILS. Class 2, Lab. 3, cr. 3. Prerequisite: CET 260.
Identification and properties of soils with emphasis on laboratory and field testing. Behavior of soils relating to design and construction of structures and highways.

CET 432. FOUNDATION CONSTRUCTION. Class 2, cr. 2. Prerequisite: CET 431.
Design and construction of shallow and deep foundations, excavating and bracing, and construction site dewatering.

CET 499. CIVIL ENGINEERING TECHNOLOGY. Cr. 1-4.
Hours, subject matter and credit to be arranged by staff. Course may be repeated for credit up to 9 hours.

CONSTRUCTION TECHNOLOGY

CNT 190. CONSTRUCTION OBSERVATION. Cr. 1.
Directed observation and inspection of construction work in progress on or near the campus. May be repeated twice.

CNT 198. CONSTRUCTION PRACTICE I. Cr. 1.
Practical experience in the construction industry with written reports of this experience for co-op students.

CNT 280. QUANTITY SURVEY AND ESTIMATING. Class 2, Lab. 3, cr. 3. Prerequisite: ART 150.
A study of methods to estimate quantities of materials required in construction. Practice in making quantity surveys. Introduction to estimating labor and costs.

CNT 298. CONSTRUCTION PRACTICE II. Cr. 1.
Practical experience in the construction industry with written reports of this experience for co-op students.

CNT 340. CONSTRUCTION SCHEDULING. Class 2, cr. 2.
A study of the planning and control of construction projects. Time schedules for materials, labor, and equipment; expediting material delivery; bar charts; and CPM scheduling.

CNT 344. CONSTRUCTION INSPECTION. Class 2, Lab. 3, cr. 3. Prerequisite: ART 276.
Inspection procedures as applied to contracted construction, and the role inspection plays in the execution of the completed contract. The laboratory period is for field trips to construction sites.

CNT 390. CONSTRUCTION EXPERIENCE. Cr. 1.
Minimum of 10 weeks work experience in the construction industry, with at least 5 weeks experience in the field. Written report of this experience.

CNT 398. CONSTRUCTION PRACTICE III. Cr. 1.
Practical experience in the construction industry with written reports of this experience for co-op students.

CNT 441. CONSTRUCTION OPERATIONS. Class 4, cr. 4. Prerequisite: Junior or senior standing.
Management, methods and equipment used in the construction of buildings, earthworks, bridges and roads. Contractor organization, job management, and safety. Excavation, formwork, concrete, masonry, and steel erection methods.

CNT 442. CONSTRUCTION COSTS AND BIDDING. Class 2, Lab. 3, cr. 3. Prerequisites: CNT 280 and CNT 441.
Estimating total job costs, and the study of bidding practices of the construction industry. Topics include: unit costs of materials and labor, quantity survey, overhead, sub-contracts, total estimated costs, and bid price. The laboratory period is for the development of costs for an actual job.

CNT 445. CONSTRUCTION MANAGEMENT. Class 3, cr. 3. Prerequisite: INDM 200.
Business policy and problems as they relate to construction companies. Contractors' organization, financial management, project management, supervision, cost analysis, and equipment economics.

CNT 498. CONSTRUCTION PRACTICE IV. Cr. 1.
Practical experience in the construction industry with written reports of this experience for co-op students.

CNT 499. CONSTRUCTION TECHNOLOGY. Cr. 1-4.
Hours, subject matter and credit to be arranged by staff. Course may be repeated for credit up to 9 hours.

ECONOMICS—See Department of Administrative Sciences

DEPARTMENT OF ELECTRICAL TECHNOLOGY

Charles E. Miller, Head

FACULTY: R. L. Anderson, L. E. Brunner (on leave), J. D. Case, S. B. Jen, B. Jovanovich, H. Lee, C. E. Miller, J. Rapal, W. W. Reed, N. Sorak, K. Steiner, T. Yackish

The electrical engineering technology program is a (two plus two) curriculum that leads to the degree of Associate in Applied Science after comple-

tion of two years and the degree of Bachelor of Science after completion of four years. A central core of required courses contained in the first three semesters will provide the student with a good fundamental program in the electrical engineering technology field. The fourth semester plan of study allows a range of elective courses to meet the individual's field of interest. The program is designed to prepare students for employment as technicians in research laboratories or in electronic industries involved in communications, electronics, industrial electronics, microwaves, computer electronics, audio, automation, electronic servicing, television, electrical power, aviation electronics and others. Graduates of the associate degree program in electrical engineering technology are eligible for certification as Associate Engineering Technicians.

The student who completes the plan of study and receives the degree of Associate in Applied Science is eligible to enter the Bachelor of Science program. He may specialize in communications, digital logic, power, industrial electronics, medical electronics, or controls by the appropriate selection of EET courses. The particular technical electives selected in other fields (technical non-EET) will depend upon the student's major interest in EET and will support this major.

ADMISSION

Persons desiring to enter the Electrical Technology program must submit an application for admission before registering for classes.

Beginning applicants seeking regular admission status must have graduated in the top ⅔ of their high school class and completed the following subjects:

1 year Algebra
1 year Plane Geometry
3 years English
1 year Science
1 year Social Science
—other units of study that total at least 15 units of credit.

In addition the results of the C.E.E.B. scholastic aptitude tests must be submitted.

Transfer applicants are expected to have earned at least a "C" average in their previous college course work and meet the minimum subject matter requirements listed above.

All applicants not meeting the above requirements may enroll in a pre-technology program of studies that will allow the student to acquire the additional background and preparation necessary to later gain regular admission in Electrical Technology.

Adults who wish to take advantage of electrical technology courses without undertaking a degree plan of study may enroll as a non-degree student. Such applicants are not required to submit transcripts or test scores.

A.A.S. DEGREE IN ELECTRICAL ENGINEERING TECHNOLOGY

An ECPD accredited engineering technology curriculum

FRESHMAN YEAR

First Semester		Second Semester)	
(4)	EET 102 (Electrical Circuits I)	(4)	EET 152 (Electrical Circuits II)
(3)	EET 104 (Electronics I: Vacuum Tubes and Transistors)	(4)	EET 154 (Electronics II)
(3)	MA 148 (Mathematics for Technology)*	(4)	PHYS 218 (Physics: Mechanics and Heat)
(3)	ENGL 104 (English Composition I)	(3)	MA 221 (Calculus for Technology I)
(13)		(15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MA 222 (Calculus for Technology II)	(4)	EET 254 (Electronics IV: Digital Logic)
(4)	EET 204 (Electronics III)	(4)	EET elective†
(4)	EET 212 (Electric Machinery)	(4)	EET elective†
(2)	MET 157 (Electrical and Electronic Drafting)	(3)	Communications, humanities, or social science elective
(3)	COM 114 (Fundamentals of Speech Communications)	(3)	Science or mathematics elective
(16)		(18)	

B.S. DEGREE IN ELECTRICAL TECHNOLOGY

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(3)	EET 383 (Advanced Electrical Networks)	(4)	EET elective
(3)	Science or mathematics elective	(3)	Technical elective (Non-EET)
(3)	Technical writing elective	(3)	Free elective
(3)	Computer elective	(3)	HSSE elective
(3)	Technical elective (Non-EET)	(3)	Communication elective
(15)		(16)	

* The entering student is placed in MA 147 (first of a two-course sequence, three credit hours) or in MA 148 (second of the two-course sequence, three credit hours) based upon his SAT math score and number of years in high school math. A student who is placed in MA 148 is granted three credit hours for MA 147 upon completion of math 148 with a grade of C or higher. Any entering student who has an SAT math score under 480 is strongly urged to take MA 147 during the summer session preceding entrance into full-time study.

† The student may choose an EET elective in digital logic, communications, power, audio or controls, depending upon his field of interest.

SENIOR YEAR

Seventh Semester		Eighth Semester	
(4)	EET elective	(2)	EET 491 (Senior Project-Construction)
(1)	EET 490 (Senior Project-Design)	(4)	EET elective
(3)	Technical elective (Non-EET)	(3)	Technical elective (Non-EET)
(3)	Science or mathematics elective	(3)	Technical elective (Non-EET)
(3)	HSSE elective	(3)	HSSE elective
		(3)	Free elective
(14)		(18)	

CERTIFICATE PROGRAM

Practical Industrial Electronics

Many industrial maintenance people now working in the fields of instrumentation and electricity have not had the opportunity to gain, through either formal education or experience, the knowledge needed in this new technology dealing with electronics. Purdue University Calumet Campus offers a two-year certificate program in electronics to assist in this demand. The goal of the course is to present the material in such a fashion that electricians, instrument men, and maintenance personnel will obtain a basic background and working knowledge of the electronic techniques necessary to install, maintain, and trouble-shoot measuring systems, communication systems, and control systems.

As this is a noncredit practical program, admission will be granted to those individuals who can profit by the training offered. The University reserves the right to limit the enrollment in these courses. The two-year program follows:

Certificate Units	Course Number and Title
	First Semester
(4)	EET 15 (Basic Electricity)
	Second Semester
(4)	EET 23 (Transistor and Vacuum Tube Fundamentals)
	Third Semester
(4)	EET 39 (Electronic Circuits)
	Fourth Semester
(4)	EET 41 (Electronic Control Circuits)

After taking the foregoing core courses some graduates have expressed an interest in further study in specialized fields. To meet this desire a third-year program has been established:

Certificate Units	Course Number and Title
	First Semester
(4)	EET 50 (Electrical Machinery)
	Second Semester
(4)	EET 51 (Electronic Instrumentation and Systems)

PERSONAL SERVICE COURSES

Students successfully completing personal service courses 1 through 99 earn certificate units and not University credit.

EET 15. BASIC ELECTRICITY. Class 2, Lab. 4, units 4.

Basic electrical terms, units, symbols, and schematics are discussed. Equipment such as voltmeters, ohmmeters, ammeters, generators, and oscilloscopes are demonstrated. Magnetism, inductance, capacitance series and parallel circuits are considered. Basic principles of alternating current, capacitance, reactance, inductive reactance, impedance, phasors, power factor, and resonance are studied.

EET 23. TRANSISTOR AND VACUUM TUBE FUNDAMENTALS. Class 2, Lab. 4, cert. units 4.

Transistor fundamentals, semiconductor diodes, vacuum tube diodes, triodes, tetrodes, pentodes are discussed. The use of oscilloscopes, audio oscillators, and voltmeters in electronic circuits such as amplifiers, power supplies, and oscillators is considered.

EET 39. ELECTRONIC CIRCUITS. Class 2, Lab. 4, cert. units 4.

Transistors and vacuum tubes used in circuits are considered. Power supply circuits, audio amplifiers, RF amplifiers, oscillators, modulation, AM transmitters and receivers, FM transmitters and receivers are discussed. Special electronic circuits such as clippers, clampers, multivibrators, blocking oscillators, sweep circuits are studied. Trouble shooting techniques are emphasized.

EET 41. ELECTRONIC CONTROL CIRCUITS. Class 2, Lab. 4, cert. units 4.

Rotating electrical machinery and control circuits, servomechanism components such as error detectors, amplifiers, detectors, magnetic amplifiers are considered. Specialized electronic control circuits are discussed.

EET 50. ELECTRICAL MACHINERY. Class 2, Lab. 4, cert. units 4.

The principles of electromagnetic energy conversion will be introduced and the relationship between electromagnetic induction and electromagnetic force will be discussed. Emphasis will be on practical applications of DC generators, AC alternators and motor-generator sets, as found in industry. The standard types of motors and their control and protection will be treated extensively. The National Electrical Manufacturers Association Standards and the National Electrical Code will be introduced.

EET 51. ELECTRONIC INSTRUMENTATION AND SYSTEMS. Class 2, Lab. 4, cert. units 4.

Study of electronic instruments, recorders, controllers, sensing devices, transducers used in open and closed loop systems, maintenance, trouble shooting, adjustment, and calibration.

UNDERGRADUATE LEVEL

EET 102. ELECTRICAL CIRCUITS I. Class 3, Lab. 3, cr. 4. Prerequisite or corequisite. MA 148.

A study of DC electrical circuits, Ohm's Law, Kirchhoff's Laws, series and parallel circuits, power, introductory magnetism, ammeters, voltmeters, ohmmeters, inductance, capacitance, and an introduction to alternating voltages, currents, and reactances.

EET 104. ELECTRONICS I. Class 2, Lab. 3, cr. 3. Prerequisite or corequisite: EET 102 or consent of instructor.

An introduction to conductors, semiconductors, insulators, and the physical construction and elementary operation of electron tubes, solid-state diodes, and transistors. Includes characteristic curves and properties related to DC load lines. An introduction to the use of electronic calculators and digital computers.

EET 152. ELECTRICAL CIRCUITS II. Class 3, Lab. 3, cr. 4. Prerequisite: EET 102 and MA 148.

A study of DC and AC electrical circuits network theorems, j operator, phasors, reactances, impedances, phase relationships, power, resonance, ideal and air-core transformers and an introduction to graphical techniques and transients.

EET 154. ELECTRONICS II. Class 3, Lab. 3, cr. 4. Prerequisites: EET 102, 104 and MA 148; prerequisite or corequisite: EET 152.

A study of the characteristics and applications of transistors, integrated circuits, and other solid-state devices. Includes rectifier circuits, waveform interpretation, AC and DC load lines, biasing techniques, equivalent circuits, single and multistage class A small-signal amplifiers, and h parameters.

EET 204. ELECTRONICS III. Class 3, Lab. 3, cr. 4. Prerequisites: EET 152, 154 and MA 221.

A study of the applications of transistors, integrated circuits, and other solid-state devices. Feedback principles as applied to amplifiers, oscillators, and regulated power supplies. Includes large-signal power amplifiers, special-purpose amplifiers, and AM and FM modulation and detection techniques. Introduction to filters as applied to tuned amplifiers and rectifier circuits.

EET 212. ELECTRICAL POWER AND MACHINERY. Class 3, Lab. 3, cr. 4. Prerequisite: EET 152 and PHYS 218.

A study of power transformers, single and polyphase circuits, and an introduction to the National Electric Code. The study of DC machines and AC single and polyphase synchonous and induction machines.

EET 254. ELECTRONICS IV. Class 3, Lab. 3, cr. 4. Prerequisites: EET 154 and MA 221.

A study of transients, waveshaping techniques, switching circuits, multivibrators, logic gates, triggering and synchronizing techniques, binary arithmetic, and introductory Boolean algebra. Includes diodes, transistors, and integrated circuits in pulse and digital applications such as shift registers and ring counters.

EET 302. ELECTRO-MECHANICAL CONTROL COMPONENTS. Class 3, Lab. 2, cr. 4. Prerequisites: EET 154 and MA 221; prerequisite or corequisite: EET 212.

A study of the components in open-loop systems. Included are sensing devices, error detectors, potentiometers, synchros, resolves, modulators, demodulators, amplifiers, motors, generators, and networks. An analysis course that stresses operation, time-and-frequency response characteristics, and proper adjustment of the components.

EET 303. COMMUNICATIONS I. Class 3, Lab. 2, cr. 4. Prerequisites: EET 204 and MA 222 or consent of instructor.

A study of AM and FM modulation and detection, receivers, transmitters, networks, filters, antennas, and transmission lines through the VHF frequency spectrum.

EET 317. PULSE AND DIGITAL CIRCUITS. Class 3, Lab. 2, cr. 4. Prerequisite: EET 254.

A study of basic analog and digital devices and circuits, arithmetic operations, codes, and combinational digital logic simplification techniques.

EET 331. GENERATION AND TRANSMISSION OF ELECTRICAL POWER. Class 3, Lab. 2, cr. 4. Prerequisite: EET 212.

A study of the generation and transmission of electrical energy. Includes techniques used by electric utilities for the protection of generating equipment and transmission lines, an introduction to the economic considerations of power plant operation, and three-winding transformers and methods of solving unbalanced three-phase systems.

EET 352. ELECTRONICS APPLICATIONS. Class 3, Lab. 2, cr. 4. Prerequisites: EET 204 and MA 222.

A study of the applications of the fundamental electrical and electronic circuits in various specialty areas. Includes selected topics such as oscillators, synchronizing sweep circuits, high-voltage power supplies, wide-band amplifiers, closed-loop feedback systems, transmission lines, UHF, VHF, radar, digital circuits, medical electronics, magnetic amplifiers, transducers, display devices, and lasers.

EET 364. ELECTRICAL MEASUREMENTS. Class 3, cr. 3. Prerequisite or corequisite: EET 254.

An advanced study of electrical instruments used to measure electric and nonelectric quantities. Explains instrument limitations, calibration procedures, possible errors, and industrial applications. Includes the analysis of precision

voltmeters, ammeters, AC and DC bridges, potentiometers, and frequency standards.

EET 368. LINEAR INTEGRATED CIRCUITS. Class 3, Lab. 2, cr. 4. Prerequisites: EET 204 and 383 or consent of instructor.

A study of the application of I.C. operational amplifiers, I.C. differential amplifiers to a multitude of applications. Specifications and limitations will also be stressed. Various special purpose I.C.'s that perform one given function will also be investigated.

EET 376. ELECTRONIC TROUBLESHOOTING LABORATORY. Class 1, Lab. 3, cr. 2. Prerequisite: EET 204.

Experimental work in analyzing and repairing equipment. The use of test instruments to locate faulty components in AM and FM receivers, television, and industrial circuits.

EET 383. ADVANCED ELECTRICAL NETWORKS. Class 3, cr. 3. Prerequisites or corequisites: EET 213 and MA 222.

An advanced course in network analysis that stresses network theorems, solutions of time- and frequency-domain problems.

EET 415. MEDICAL ELECTRONICS. Class 2, Lab. 2, cr. 3. (Not open to EET student).

A survey covering the fundamental concepts of electricity and electronics as they relate to the medical field. Emphasis will be placed upon the safe and effective operation of electrical and biomedical electronic equipment.

EET 417. ANALOG AND DIGITAL CIRCUITS. Class 3, Lab. 2, cr. 4. Prerequisites: EET 317 and 383.

A study of analog and digital devices; flip-flops, counters, shift registers, linear devices, multiplier, dividers, analog circuits, memory systems, multiplexing, and sequential circuit analysis and synthesis.

EET 463. COMMUNICATIONS II. Class 3, Lab. 2, cr. 4. Prerequisites: EET 303 and 383.

A study of high frequency systems (1-meter or less) and microwave technology to familiarize the student with the fields of radar, facsimile, television, transmission lines, antennas, propagation, wave guides and cavities, and measuring equipment.

EET 472. AUTOMATIC CONTROL SYSTEMS. Class 3, Lab. 2, cr. 4. Prerequisite: EET 302 and 383 or consent of instructor.

The transfer function approach to the study of feedback control systems. Stability criteria are examined. Uses of Nichols charts, Bode diagrams and root-locus plots to predict performance are studied. Analog and digital simulation is introduced and various techniques are applied to selected industrial control systems.

EET 490. SENIOR DESIGN PROJECT PHASE I. Cr. 1, hours arranged. Prerequisite: consent of instructor.

An extensive individual design and/or analytical project performed in consultation with one or more faculty advisers. Collaboration with representatives of industry, government agencies, or community institutions is encouraged. Evidence of extensive and thorough laboratory performance is required.

PHASE I includes, but is not limited to: (1) faculty acceptance of project proposal, (2) defining and limiting project objectives, (3) initial research and source contacts, (4) procurement of materials, and (5) periodic progress reports.

EET 491. SENIOR DESIGN PROJECT, PHASE II. Cr. 2-5, hours arranged. Prerequisite: EET 490.

PHASE II includes, but is not limited to: (1) Continued research and finalized design, (2) oral presentation to faculty and other interested parties, and (3) standard format written technical report.

EET 499. ELECTRICAL ENGINEERING TECHNOLOGY. Cr. 1-9, hours and subject matter to be arranged by staff. Course may be repeated for credit up to nine hours.

DEPARTMENT OF ENGINEERING

Izydor Eisenstein, Head

FACULTY: J. R. Battenburg, E. H. Buyco, W. Y. Chen, I. Eisenstein, R. L. Gonzales, D. K. Goodman, S. T. Hsieh, J. H. Packer, D. G. Skitek

Professional engineering has been defined as the art and science which adapts materials found in nature to more useful forms and harnesses natural forces to do man's work, at a reasonable cost in both time and energy. As a result of his education and training, the professional engineer is able to apply the scientific method and perspective to solve problems, create new products, and assume responsibility in fields of research, designing, manufacturing and managing.

The engineering curriculum provides the opportunity for a thorough education in the physical sciences, the engineering sciences and mathematics and the application of these fundamentals to the solution of problems encountered in engineering practice. The curriculum also enables the engineering student to develop capabilities in the effective communication of ideas by means of spoken and written language as well as graphical techniques. Finally, the engineering curriculum affords a sound introduction to the social studies and humanities. Thus the engineering student, through his studies, work experiences, and membership in professional societies, receives the foundation to prepare him to enter the practice of professional engineering or to begin a program of graduate studies.

The engineering studies in the four-year interdisciplinary program lead to a B.S.E. (Bachelor of Science in Engineering) degree. Students can pursue their studies in one of the three programs: Interdisciplinary Engineering (IDE), Interdisciplinary Engineering with Electrical Engineering option (IDE-EE), and Interdisciplinary Engineering with Mechanical Engineering option (IDE-ME). The freshman year is identical for all three programs and in the sophomore year the difference is only in one course. The main variations in options are in the junior and senior years. This program provides a very flexible curriculum and permits students to concentrate their efforts in the traditional engineering disciplines or allows them considerable latitude in designing a course of study especially suited to their interests. Graduates of the interdisciplinary curriculum are fully qualified for immediate employment. They might, however, pursue professional engineering specialties in programs at Purdue leading to a master's degree in keeping with a now well-established trend to pursue a fifth year of study before entering the profession.

For students interested in the following engineering disciplines: aeronautical engineering, agricultural engineering, chemical engineering, civil engineering, industrial engineering, metallurgical engineering, instruction is available through the freshman or sophomore year. The student can then transfer to the campus in Lafayette. In general, the student can transfer to the Lafayette campus any time without loss of credits.

ADMISSION REQUIREMENTS

For admission to the undergraduate Engineering program the student must rank in the upper half of his high school class and have completed the following high school subject matter requirements:

3 semesters of algebra
2 semesters of geometry
1 semester of trigonometry
2 semesters of laboratory science
6 semesters of English

Students who are deficient in the above subject matter requirements can take remedial work to gain admission to the Engineering program.

College Entrance Examination Board (CEEB) Tests—Applicants who have not recently completed a full year of college study should submit their results of the Scholastic Aptitude Test (SAT) or Illinois residents may submit the American College Test (ACT). SAT or ACT results from a junior year test date or results from a test date in the senior year are acceptable. Prior to registration beginning freshmen in Engineering must submit results of the CEEB achievement tests in English, mathematics and chemistry (students who have not had chemistry may substitute physics or biology).

PASS/NOT PASS POLICY

1. Subject to the regulations, a student may elect this option in any course which does not already appear on his academic record and in which he is otherwise eligible to enroll for credit with letter grade. A student may not elect this option for more than 20 per cent of the total credit hours required for his graduation.
2. The registrar's class rosters will indicate which students have elected this option.
3. A student who is enrolled in a course under this option has the same obligations as those who are enrolled in the course for credit with letter grade. When the instructor reports final grades in the course, he will report that any such student who would have earned a grade of A, B, or C has "passed" the course and that any other such student has "not passed." The registrar will make an appropriate notation on the student's academic record in place of a letter grade but will not use the course in computing grade indices.
4. In engineering, the pass/not pass option shall *not* be available for required courses in the Freshman year.
5. This option shall *not* be available to students on probation.
6. This option shall be available for a maximum of two courses in any one semester, one course during a summer session.
7. Consistent with the policy of the Department of Engineering, a student receiving the grades of "pass" in a course taken under the pass/not pass option may not take the same course for a letter grade.

Engineering Laboratories

Laboratory facilities in the Department of Engineering for undergraduate instruction include: Electrical Engineering Laboratory, Engineering Computer Laboratory, Fluid and Energy Laboratory, and Materials and Metallurgical Laboratory. These laboratories are also used for graduate instruction and research work.

Electrical Engineering Laboratories

The Department of Engineering has a wide variety of well-equipped electrical laboratory facilities to service the undergraduate laboratory courses and for elective advanced laboratory courses.

Equipment is available for experimentation ranging from the elementary to the advanced in areas of circuits, electronics, energy conversion, signal transmission, analog computation and digital computation. In addition, special purpose facilities are available for advanced student projects requiring sophisticated instrumentation.

Engineering Computer Laboratory

A versital computer facility is available within the Engineering Department for undergraduate instruction and student originated research projects. Two SIMULATOR 240 electronic analog computers with supporting nonlinear and digital logic units are used for general laboratory instruction and physical system modeling and analysis in several of the undergraduate courses.

A Data General NOVA 800 Minicomputer is available as a teaching aid and a computational instrument. With its time-sharing capability NOVA 800 users both within the university and the surrounding communities have access to its use at virtually the same time.

Two MINUTEMAN computers, made by Autonetics, are available in the department for student projects ranging from software design and modification to hardware design and peripheral interfacing problems.

In addition, the engineering student can make use of the facilities at the University Computer Center. The Center is equipped with IBM 1620 and IBM 360 computers, and is linked with the major computing system Control Data Corporation (CDC) 6500.

Fluid and Energy Laboratory

This laboratory is well equipped with modern instruments capable of supporting students experiments, and student and faculty research in the field of fluid mechanics. Major equipment available includes: a subsonic wind tunnel for external flow studies, a pipe loop apparatus for frictional flow studies, a water table apparatus for drag studies, and failing sphere viscometers.

Materials and Metallurgical Laboratory

This laboratory consists of metallurgical specimen preparation equipment, heat treatment equipment, materials testing apparatus, and metallurgical microscopes. The laboratory is used in undergraduate materials courses for the following demonstrations: tensile testing, impact testing, hardness testing, optical microscopy, Jominy test, and heat treatment.

Presently equipment is being acquired for two new laboratories:

(a) Electrical multi-purpose laboratory equipped for digital logic, medical electronics, control instruments, and energy conversion.

(b) Systems Dynamics and Measurement Laboratory equipped with a variety of devices to illustrate the concepts of system dynamics, static and dynamics measurements, balancing, torsional and linear vibration apparatus, and shaft whirling.

The use of these laboratories is projected for spring semester 1976.

B.S. DEGREE IN ENGINEERING

I. INTERDISCIPLINARY ENGINEERING PROGRAM (IDE)

(Total Credits—125 Semester Hours Minimum)

FRESHMAN YEAR

First Semester

(5) MA 163 (Calculus and Analytical Geometry I)
(4) CHM 115 (General Chemistry)
(3) ENGR 190 (Elementary Engineering Design)
(3) COM 114 (Fundamentals of Speech Communication)
(0) ENGR 178 (Freshman Engineering Lectures)
(2) EG 114 (Drafting)

(17)

Second Semester

(5) MA 164 (Calculus and Analytical Geometry II)
(3) MSE 200 (Materials Science)
(3) PHYS 152 (Mechanics)
(1) PHYS 152L (Laboratory in Mechanics)
(3) ENGL 104 (English Composition I)
(1) ENGR 179 (Freshman Engineering Lectures)

(16)

SOPHOMORE YEAR

Third Semester

(4) MA 261 (Multivariate Calculus)
(4) PHYS 261 (Electricity & Optics)
(3) A&AE 207 (Basic Mechanics I)
(3) EE211 (Linear Circuits I)
(1) EE 217 (Linear Circuits Laboratory I)

(15)

Fourth Semester

(4) MA 262 (Linear Algebra and Differental Equations)
(3) A&AE 208 (Basic Mechanics II)
(3) EE 212 (Linear Circuits II)
(1) EE 218 (Linear Circuits Laboratory II)
(3) Technical Elective
(3) General Education Elective

(17)

JUNIOR YEAR

Fifth Semester

(3) ME 305 (General Thermodynamics I)
(3) Technical Elective
(3) Technical Elective
(3) ME 340 (Measurements & Computers)
(3) A&AE 364 (Dynamics of Physical Sys.)

(15)

Sixth Semester

(3) Technical Elective
(3) Technical Elective
(3) Technical Elective
(3) STAT or Math. Elective
(3) General Education Elective

(15)

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	EE 495M (Senior Engineering Design I)	(3)	EE 495N (Senior Engineering Design II)
(3)	IE 356 (Human Factors Design)	(3)	Technical Elective
(3)	Technical Elective	(3)	Elective
(3)	Technical Elective	(3)	General Education Elective
(3)	General Education Elective	(3)	General Education Elective
(15)		(15)	

II. INTERDISCIPLINARY ENGINEERING PROGRAM (IDE-EE)

ELECTRICAL ENGINEERING OPTION

(Total Credits—126 Semester Hours Minimum)

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Calculus and Analytical Geometry I)	(5)	MA 164 (Calculus and Analytical Geometry II)
(4)	CHM 115 (General Chemistry)	(3)	MSE 200 (Materials Science)
(3)	ENGR 190 (Elementary Engineering Design)	(3)	PHYS 152 (Mechanics)
(3)	COM 114 (Fundamentals of Communication)	(1)	PHYS 152L (Laboratory in Mechanics)
(0)	ENGR 178 (Freshman Engineering Lectures)	(3)	ENGL 104 (English Composition I)
(2)	EG 114 (Drafting)	(1)	ENGR 179 (Freshman Engineering Lectures)
(17)		(16)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(4)	PHYS 261 (Electricity & Optics)	(3)	A&AE 208 (Basic Mechanics II)
(3)	A&AE 207 (Basic Mechanics I)	(3)	EE 212 (Linear Circuits II)
(3)	EE 211 (Linear Circuits I)	(1)	EE 218 (Linear Circuits Laboratory II)
(1)	EE 217 (Linear Circuits Laboratory I)	(4)	EE 4951 (Digital Systems—Logic Design)
		(3)	General Education Elective
(15)		(18)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(3)	ME 305 (General Thermodynamics I)	(3)	A&AE 364 (Dynamics of Physical Sys.)
(3)	EE495K (Electrical Circuits III)	(3)	Technical Elective
(3)	EE 311 (Electrical and Magnetic Fields)	(3)	Technical Elective
(3)	EE 495E (Linear Electronics)	(3)	STAT or Math. Elective
(3)	ME 340 (Measurements & Computers)	(3)	General Education Elective
(15)		(15)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	EE 495M (Senior Engineering Design I)	(3)	EE 495N (Senior Engineering Design II)
(3)	IE 356 (Human Factors Design)	(3)	Technical Elective
(3)	Technical Elective	(3)	Elective
(3)	Technical Elective	(3)	General Education Elective
(3)	General Education Elective	(3)	General Education Elective
(15)		(15)	

III. INTERDISCIPLINARY ENGINEERING PROGRAM (IDE-ME)

MECHANICAL ENGINEERING OPTION

(Total Credits—126 Semester Hours Minimum)

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Calculus and Analytical Geometry I)	(5)	MA 164 (Calculus and Analytical Geometry II)
(4)	CHM 115 (General Chemistry)	(3)	MSE 200 (Materials Science)
(3)	ENGR 190 (Elementary Engineering Design)	(3)	PHYS 152 (Mechanics)
(3)	COM 114 (Fundamentals of Speech Communication)	(1)	PHYS 152L (Laboratory in Mechanics)
(0)	ENGR 178 (Freshman Engineering Lectures)	(3)	ENGL 104 (English Composition I)
(2)	EG 114 (Drafting)	(1)	ENGR 179 (Freshman Engineering Lectures)
(17)		(16)	

SOPHOMORE YEAR

Third Semester

(4) MA 261 (Multivariate Calculus)
(4) PHYS 261 (Electricity & Optics)
(3) A&AE 207 (Basic Mechanics I)
(3) EE 211 (Linear Circuits I)
(1) EE 217 (Linear Circuits Laboratory I)

(15)

Fourth Semester

(4) MA 262 (Linear Algebra and Differential Equations)
(3) A&AE 232 (Introduction to Mechanics of Solids)
(3) A&AE 208 (Basic Mechanics II)
(3) EE 212 (Linear Circuits II)
(1) EE 218 (Linear Circuits Laboratory II)
(3) General Education Elective

(17)

JUNIOR YEAR

Fifth Semester

(3) ME 305 (General Thermodynamics I)
(4) ME 310 (Fluid Mechanics)
(3) MSE 411 (Engineering Materials)
(3) ME 340 (Measurements & Computers)
(3) A&AE 364 (Dynamics of Physical Sys.)

(16)

Sixth Semester

(3) Technical Elective
(3) Technical Elective
(3) ME 261 (Introduction to Engineering Design)
(3) STAT or Math. Elective
(3) General Education Elective

(15)

SENIOR YEAR

Seventh Semester

(3) EE 495M (Senior Engineering Design I)
(3) IE 356 (Human Factors Design)
(3) Technical Elective
(3) Technical Elective
(3) General Education Elective

(15)

Eigth Semester

(3) EE 495N (Senior Engineering Design II)
(3) Technical Elective
(3) Elective
(3) General Education Elective
(3) General Education Elective

(15)

Only those students with adequate preparation will be expected to accomplish the freshman year of study in two semesters. Students with inadequate background training, particularly in mathematics and chemistry may require an additional semester or summer session to attain sophomore standing.

The following indicates the general guidelines which an Engineering Student must follow. Deviations from this may be allowed but must have the approval of the Engineering Faculty.

Mathematics Preparation:

Students with no high school trigonometry or SAT scores below 570 are advised to enroll in MA 151 before enrolling in MA 163.

Chemistry Preparation:

a) Students who are *well prepared* (i.e., 1 year of high school Chem. & Chem-Comp. between 500 & 570) may enter Chem 115.

b) Students who do not meet the criteria set forth above should first enroll in CHEM III and then take CHEM 112.

Engineering Graphics Preparation:

Students with a good high school graphics background (i.e., 2 years of mechanical drawing and ability to pass a proficiency exam) may enter ENGR 190. Those students who do not meet this criteria should take EG 114 before or concurrently with ENGR 190.

Electives

The electives must be chosen in accordance with the following conditions:

1. General education electives must be chosen to conform with the requirements of the Department of Engineering. 21 hours of general education courses are required according to the following distribution:
   a. Six credit hours in communications are required in the freshman engineering program. These are ENGL 103 or 104 and COM 114.
   b. The remaining 15 credit hours must be selected from two groups of course sequences.
   Each student must select one nine-hour sequence from one group and one six-hour sequence from the other.

Group I	**Group II**
Languages	Literature
Economics	Communication and theatre
Political science	Independent reading
Psychology	History
Sociology	Philosophy
	Creative arts
	General studies

The immediately preceding sequences provide depth to the various programs in the social sciences, fine arts, and humanities.

A pamphlet is available from student counselors for the benefit of all the engineering students, stating the objectives of the General Education Program. Included in the pamphlet are an analysis and description of the objectives of each of the sequences.

2. Technical electives are to be selected with the advice of a counselor from 300-, 400-, and 500-level courses to meet the student's educational objectives.

The following courses are available as electives:

A&AE 547	(Experimental Stress Aanalysis)
CE 570	(Advanced Structural Mechanics)
CE 573	(Basic Vibrations))

CS 414	(Introduction to Numerical Analysis)
EE 311	(Electrical and Magnetic Fields)
EE 321	(Electromagnetic Conversion Principles)
EE 409	(Engineering Administration)
EE 432	(Elements of Power System Engineering)
EE 495E	(Linear Electronics)
EE 495F	(Digital Systems—Electronics)
EE 495G	(Digital Systems—Software)
EE 495H	(Digital Systems—Design)
EE 496	(Electrical Engineering Projects)
EE 583	(Introduction to Automatic Control Systems)
IE 530	(Quality Control)
IE 590E	(Engineering Statistical Analysis)
IE 590H	(Health Systems Engineering)
MA 501	(Techniques of Applied Math I)
MA 502	(Techniques of Applied Math II)
MA 510	(Advanced Calculus)
MA 520	(Boundary Value Problems of Differential Equations)
MA 525	(Introduction to Complex Analysis)
ME 306	(General Thermodynamics II)
ME 310	(Fluid Mechanics)
ME 315	(Heat and Mass Transfer)
ME 370	(Machine Analysis and Design)
ME 416	(Air Conditioning Equipment)
ME 440	(Internal Combustion Engines)
ME 500	(Thermodynamics)
ME 505	(Heat and Mass Transfer)
ME 509	(Intermediate Fluid Mechanics)
ME 510	(Gas Dynamics)
ME 513	(Engineering Acoustics)
ME 528	(Air Polution)
ME 560	(Kinematics)
ME 563	(Mechanical Vibrations)
ME 569	(Mechanical Behavior of Materials)
ME 580	(Nonlinear Systems)
MSE 411	(Engineering Materials)
MSE 576	(Corrosion)
MSE 597A	(The Physical Chemistry of Iron and Steel Production)
MSE 597B	(Phase Transformations and Physical Properties)
MSE 597C	(Mechanical Behavior of Materials)
NUCL 501	(Nuclear Engineering Principles)
NUCL 502	(Nuclear Engineering Systems)
NUCL 510	(Nuclear Reactor Theory I)
NUCL 520	(Radiation Effects and Reactor Materials)
PHYS 342	(Modern Physics)
PHYS 545	(Solid State Physics)
PHYS 550	(Introduction to Quantum Mechanics)
PHYS 556	(Introductory Nuclear Physics)
STAT 511	(Statistical Methods I)
STAT 516	(Basic Probability and Applications)

Selection of Technical Electives:

The Interdisciplinary Engineering Option (IDE) provides for nine technical electives from the fields of science, engineering, mathematics, computer science and other related fields where such electives will strengthen the student's ability in a chosen field of interest. When the IDE option is selected the student must submit a coordinated plan of study covering the technical electives. Such plan of study, where approval is contingent on the electives being well coordinated in the students specialized interest, must be authorized by the student's academic advisor and by the head of the engineering department.

In the Electrical Engineering Option (IDE-EE) three technical electives out of five must be chosen from the following list:

EE 321, 409, 432, 495F, 495G, 495H, 583
ME 310, 315
MA 510, 520, 525
STAT 511, 516
IE 590
CS 414
PHYS 342

In the Mechanical Engineering Option (IDE-ME) three technical electives out of five must be chosen from the following list:

ME 306, 315, 370, 416, 440, 500, 505, 509, 510, 563
EE 409, 495E, 495F, 583
MA 510, 520, 525
STAT 511, 516
IE 590
CE 570, 573
CS 414
PHYS 342
A&AE 547

The remaining two technical electives may be chosen from science, engineering, or other technical areas.

3. The three-hour free elective may be either a general education elective or a technical elective.

ENGINEERING CURRICULUM COURSES

UNDERGRADUATE LEVEL

A&AE 207. BASIC MECHANICS I. Class 3, cr. 3. Prerequisite: PHYS 152; prerequisite or corequisite: MA 261.

Review of vector algebra and equilibrium. Hydrostatics, virtual work, static stability, friction. First and second moments of areas, volumes, and masses, center of gravity.

A&AE 208. BASIC MECHANICS II. Class 3, cr. 3. Prerequisites: MA 261 and A&AE 207.

Fundamental concepts, kinematics, translation and rotation. Kinetics impulse, momentum, work, energy. Rectilinear and curvilinear translation of point masses. Plane motion of rigid bodies and vibration.

A&AE 232. INTRODUCTION TO MECHANICS OF SOLIDS. Class 3, cr. 3. Prerequisite: A&AE 207; prerequisite or corequisite: A&AE 208 or equivalent.

Deformation, strain, stress, equations of equilibrium. Elastic stress-strain relation. Theory of tension, bending, torsion. Plas-

tic deformation, yield criterion. Stress-strain relation of plasticity. Application to bending and torsion. Elements of limit analysis, viscoelastic bodies, simple models, nonlinear creep.

EE 211. LINEAR CIRCUITS I. Class 3, cr. 3. Prerequisite: MA 164 and PHYS 152 or permission of instructor. Corequisite: MA 261, PHYS 261 and EE 217.

Volt-ampere characteristics of circuit elements; independent and dependent sources; Kirchoff's Laws and circuit equations. Source transformations; Thevenin's and Norton's Theorems; superposition. Transient response of RC, RL, and RLC circuits. Sinusoidal steady-state and impedance. Instantaneous and average power.

EE 212. LINEAR CIRCUITS II. Class 3, cr. 3. Prerequisite: EE 211 and EE 217. Corequisite: MA 262 or permission of instructor.

A continuation of EE 211. Bode diagrams, complex plane, resonance, coupled circuits. Two-port network parameters. Fourier series, State variable formulation. LaPlace Transformation.

EE 217. LINEAR CIRCUITS LAB. I. Lab. 3, cr. 1. Prerequisite: MA 164 and PHYS 152 or premium of instructor. Corequisite: EE 211.

It is the purpose of this laboratory to reinforce experimentally as many of the concepts presented in the lectures of EE 211 as possible. The student will also become familiar with the wide variety of testing equipment at his disposal. The student will be introduced to Computer Aided Circuit Analysis.

EE 218. LINEAR CIRCUITS LAB. II. Lab. 3, cr. 1. Prerequisite: EE 211, EE 217. Corequisite: EE 218 and MA 262

It is the purpose of this laboratory to reinforce experimentally as many of the concepts presented in the lectures of EE 212 as possible. In addition, the student will be introduced to more advanced testing and measurement equipment. More instruction in computer aided circuit analysis will be given.

EG 114. DRAFTING I. Lab. 6, cr. 2.

A basic course in geometrical constructions, multiview drawing, dimensioning, pictorial drawing, and sketching. Problems designed to require practical reasoning and develop good techniques.

ENGR 110. INTRODUCTION TO DIGITAL COMPUTERS. Class 2, Lab. 3, cr. 3.

ENGR 178. FRESHMAN ENGINEERING LECTURES. Class 1, cr. 0.

An introduction to the engineering profession.

ENGR 179. FRESHMAN ENGINEERING LECTURES. Class 1, cr. 1. Prerequisite: ENGR 178.

An introduction to numerical analysis and digital computers.

A continuation of ENGR 178.

ENGR 190. ELEMENTARY ENGINEERING DESIGN. Class 1, Lab. 6, cr. 3, or Class 2, Lab. 3, cr. 3.

An introduction to engineering design.

ME 261. INTRODUCTION TO ENGINEERING DESIGN. Class 2, Lab. 3, cr. 3. Prerequisite A&AE 232.

Principles of kinematics and mathematical modeling of machine elements. Application of these priniciples to specific engineering problems and also to problems of wider scope requiring the decision making and creative thought process characteristics of engineering design. Analytical and computer techniques.

MSE 200. MATERIALS SCIENCE. Class 3, cr. 3. Prerequisite: CHM 115 or equivalent.

An introductory course designed to provide a basic background in the broad field of materials science. Emphasis is placed on the chemical and physical principles underlying the utilization and behavior of metals, alloys, ceramics, composites, and aggregates in engineering.

A&AE 364. DYNAMICS OF PHYSICAL SYSTEMS. Class 3, cr. 3. Prerequisites: MA 262; sophomore level circuits and mechanics.

Analytical models of physical elements and systems; linearization and superposition. Natural and forced response for mechanical, electrical and other physical systems. Dynamic characteristics and stability of systems; state variable methods and S-plane analysis. Convolution, Fourier, and Laplace techniquies. Introduction to feedback control systems.

EE 311. ELECTRIC AND MAGNETIC FIELDS. Class 3, cr. 3. Prerequisite: MA 262; prerequisite or corequisite: EE 202.

Vector algebra, vector calculus, electrostatics, magnetostatics, time-varying fields, introduction to Maxwell's equations.

EE 321. INTRODUCTION TO ELECTRIC ENERGY ENGINEERING. Class 3, cr. 3. Prerequisite: EE 301; prerequisite or corequisite: EE 311.

Energy needs and sources, transformers, electromechanical and nonconventional energy conversion transmission, power system characteristics.

EE 409. ENGINEERING ADMINISTRATION. Class 3, cr. 3. Prerequisite: senior classification.

Value and use of money; depreciation, economic selection, cost determination; business law, engineering procedures, and professional ethics.

EE 432. ELEMENTS OF POWER SYSTEM ENGINEERING. Class 3, cr. 3. Prerequisite: EE 202.

Three-phase circuits. Equivalent single phase circuits. Electrical characteristics of lines, transformers, generators, and loads with particular reference to their behavior when interconnected as systems.

EE 483. AUTOMATIC CONTROL SYSTEMS. Class 3, cr. 3. Prerequisite: EE 301; prerequisite or corequisite: EE 321.

Component and system transfer functions. Transient response to deterministic inputs and definition of time domain specifications. Open and closed loop frequency response. Bode diagrams, Nyquist diagrams, root locus, and frequency specifications. Stability and relative stability criteria. Introduction to synthesis. This course is not recommended for those students who intend to do graduate work in automatic control.

EE 495. SELECTED TOPICS IN ELECTRICAL ENGINEERING. Cr. 1-4.

EE 495E. LINEAR ELECTRONICS. Class 2, Lab. 3, cr. 3. Prerequisite: MA 262, EE 212 and EE 218 or equivalent. Corequisite: None.

Transport phenomena in semiconductors, junction diode theory, diode circuits, transistor theory, blasing and stabilization, low and high frequency effects of transistors, field effect transistors, multistage amplifiers.

EE 495F. DIGITAL SYSTEMS—ELECTRONICS. Class 2, Lab. 3, cr. 3. Prerequisite: EE 495E. Corequisite: None.

Diode logic, transistor logic, resistor-transistor logic, diode-transistor logic, transistor-transistor logic, bistable, monostable, and astable multivibrators, Schmidt trigger, negative resistance switching.

EE 495G. DIGITAL SYSTEMS—SOFTWARE. Class 2, Lab. 3, cr. 3. Prerequisite: EE 495I. Corequisite: None.

Basic computer software techniques at the assembly and machine code levels. Hardware and software features of central processor units. 1/0 devices, servicing and bulk memory devices, executive software for data processing and process control.

EE 495H. DIGITAL SYSTEMS—DESIGN. Class 2, Lab. 3, cr. 3. Prerequisite: EE 495G. Corequisite: None.

Design projects in hardware, software and coordinated computer systems. Topics in software management of processors and process controls and related hardware design of computing systems. Discussion of peripheral devices and controls.

EE 495I. DIGITAL SYSTEMS—LOGIC DESIGN. Class 3, Lab. 1, cr. 4. Prerequisite: None. Corequisite: None.

Boolean Algebra, binary numbers, combinational logic, minimization techniques for combinational logic, Karnaugh mapping methods, sequential systems analysis and design, binary arithmetic. A systems approach to the logical design of digital systems. Exclusive use of integrated logic chips is used to implement logical designs.

EE 495J. INTRODUCTION TO PROGRAMMING IN BASIC. Lab. 3, cr. 1. Prerequisite: None. Corequisite: None.

Introduction to programming in the Basic language. Use of both the NOVA 800 and IBM 360 computers will be made in applying programming techniques.

EE 495K. PASSIVE NETWORKS. Class 3, cr. 3. Prerequisite: EE 212 and EE 218. Corequisite: EE 495E.

Advanced circuit concepts, fourier analysis, Laplace analysis, passive filter design, active filter design, passive network synthesis, computer aided design and analysis methods, frequency response methods.

EE 495M. SENIOR ENGINEERING DESIGN I. Class 1, Lab. 6, cr. 3. Prerequisite: Senior standing. Corequisite: None.

EE 495N. SENIOR ENGINEERING DESIGN II. Class 1, Lab. 6, cr. 3. Prerequisite: EE 495 M. Corequisite: None.

The senior engineering design courses I and II constitute a two-semester sequence of an interdisciplinary activity. The objective of these courses is to provide engineering students with expe-

rience in interdisciplinary engineering design. Application of the design process and practice in which students are assigned or select suitable projects. Students working in teams pursue an idea from conception to realistic design. The course is climaxed by a preparation of a substantial written report and a formal presentation before the faculty and students.

EE 496. ELECTRICAL ENGINEERING PROJECTS. Hours and credits to be arranged.

IE 356. HUMAN FACTORS DESIGN. Class 3, cr. 3. Prerequisite: IE 230 or STAT 311.

Engineering design and analysis of man-machine systems. Study of man's input, output, and processing subsystems. Measurement of human factors. Environmental and task considerations in the design and performance of total systems.

ME 305. GENERAL THERMODYNAMICS I. Class 3, cr. 3. Prerequisites: MA 262 and PHYS 261.

First and second laws, properties. Application to several types of systems.

ME 306. GENERAL THERMODYNAMICS II. Class 3, cr. 3. Prerequisite: ME 305.

Continuation of ME 305. Thermodynamic properties, mixtures, thermochemistry and chemical equilibrium, cycles, introduction to statistical thermodynamics.

ME 308. THERMOPHYSICS. Class 4, cr. 4. Prerequisite: MA 318.

Energy balances and equations of state or fixed mass systems, properties, second law of thermodynamics, entropy. Introduction to kinetic theory and transport properties and the statistical mechanics of independent particles. Fundamentals of heat transfer by conduction, convection, and radiation.

ME 310. FLUID MECHANICS. Class 4, Problem 1, Lab. 2, cr. 4. Prerequisites: MA 262, A&AE 208. Corequisite: ME 305.

Continuum, velocity field, fluid statics, basic conservation laws for systems and control volumes, dimensional analysis, Euler and Bernoulli equations, viscous flows, boundary lay, flow in channels and around submerged bodies, one-dimensional gas dynamics.

ME 315. HEAT AND MASS TRANSFER. Class 3, Problem 1, Lab. 2, cr. 4. Prerequisite or corequisite: ME 310.

Fundamental principles of heat transfer by conduction, convection, and radiation; mass transfer by diffusion and convection. Emphasis on process heat transfer and application to design.

ME 340. MEASUREMENTS AND COMPUTERS. Class 2, Lab. 3, cr. 3. Prerequisites: MA 262 and A&AE 364.

Characterization and behavior of typical measuring systems with emphasis on transfer function and frequency response techniques. Transducers, amplifiers, computing devices, readout devices, and their response to steady and transient phenomena. Introduction to analog and digital computers.

ME 370. MACHINE ANALYSIS AND DESIGN. Class 3, Lab. 3, cr. 4. Prerequisites: ME 261 and A&AE 208.

Applications of Mechanics I and II (statics and dynamics) to machines. Analytical, graphical, and computer techniques for kinematic and dynamic analysis. Kinematic and dynamic synthesis to meet design requirements.

ME 416. AIR CONDITIONING EQUIPMENT. Class 3, cr. 3. Prerequisite: ME 305.

Heating and cooling loads. Psychrometrics. Air distribution and duct design. Air contaminants and air cleaners. Industrial air and gas cleaners. Fans, pumps, refrigeration compressors, chillers, cooling towers, and other air conditioning components. Equipment selection.

ME 440. INTERNAL COMBUSTION ENGINES. Class 3, cr. 3. Prerequisite: ME 305.

Basic principles; theoretical and actual cycles; performance characteristics; combustion; carburetion; air capacity; fuels and lubricants; accessories and controls.

ME 497. SELECTED TOPICS IN MECHANICAL ENGINEERING. Cr. 1-6.

Available upon arrangement with the head of the school. May be repeated for credit.

MSE 411. ENGINEERING MATERIALS. Class 3, cr. 3. Prerequisite: MSE 200 and A&AE 232 or equivalent.

Structure of metals, ceramics, polymers, and other solid engineering materials. Crystallographic principles. Chemical bonding. Crystal imperfections. Phase equilibria. Irreversible processes in solids. Relations of structure to mechanical, physical, and chemical properties. Applications to materials selection and design.

DUAL LEVEL
(Undergraduate-Graduate)

A&AE 547. EXPERIMENTAL STRESS ANALYSIS. Class 2, Lab. 3, cr. 3. Admission by consent of instructor.

Theory and application of photoelastic, electric strain gage, and brittle lacquer methods of experimental stress analysis for static and dynamic loadings. Strain gage work will include strain rosettes.

CE 570. ADVANCED STRUCTURAL MECHANICS. Class 3, cr. 3. Prerequisites: A&AE 232 and MA 262.

Flexure and torsion; energy methods, Castigliano's theorems, complementary energy theorem. Maxwell-Mohr method; indeterminate structural and machine members; introduction to ultimate load analysis of indeterminate members; beam columns and beam-tension members.

CE 573. BASIC VIBRATIONS. Class 3, cr. 3. Prerequisites: A&AE 232 and MA 262 or equivalent.

Harmonic motion; free and forced vibrations of one degree-of-freedom systems with and without damping; vibration measuring instruments, transmissibility; systems with two or several degrees of freedom; Holzer's method; vibration of rods and beams, critical speed of shafts, Rayleigh and Stodola methods.

EE 583. INTRODUCTION TO AUTOMATIC CONTROL SYSTEMS. Class 3, cr. 3. Prerequisite: A&AE 364 or equivalent.

Mathematical modeling of a system. Linear systems analysis in the time and frequency domains. State variables and transfer functions. Stability, controllability and observability. Feedback control design techniques. Equalizer synthesis is on Bode-Nyquist and root-locus diagrams. Analytic design and parameter optimiztion techniques.

EE 595. SELECTED TOPICS IN ELECTRICAL ENGINEERING. Hours and credits to be arranged.

IE 530. QUALITY CONTROL. Class 3, cr. 3. Prerequisite: IE 330 or STAT 511 or equivalent.

Principles and practices of quality control in industry; administrative and engineering aspects of quality control programs; introduction to statistical quality control.

IE 590. TOPICS IN INDUSTRIAL ENGINEERING. Credit and hours to be arranged.

Selected topics in industrial engineering for seniors and graduate students. May be repeated with permission of adviser.

IE 590E. ENGINEERING STATISTICAL ANALYSIS. Class 3, cr. 3. Prerequisite: MA 262 or consent of instructor.

Descriptive statistics; elementary probability; sampling distributions; inference, testing hypotheses, and estimation; Normal, binomial, Poisson, hypergeometric distributions; one way analysis of variance; contingency tables.

IE 590H. HEALTH SYSTEMS ENGINEERING. Class 3, cr. 3. Prerequisite: Statistics, Mathematics.

The course examines the community role of health facilities and describes methodology for the design and control of their operations. Discussion includes: the health care delivery system, planning and control of health facilities, describing and predicting needs, controlling demands, data collection including costs, resource allocation, controlling resources, and health services planning.

ME 500. THERMODYNAMICS. Class 3, cr. 3. Prerequisites: ME 302 and MA 302.

The empirical, physical basis of the laws of thermodynamics. Formulation of the definitions and laws from the postulational approach. Properties and relations between properties in homogeneous and heterogeneous systems. The criteria of equilibrium. Application to a variety of systems and problems; phase and reaction equilibrium.

ME 505. HEAT AND MASS TRANSFER. Class 3, cr. 3. Prerequisite: ME 315.

Heat conduction and mass diffusion in two and three dimensions with application of analytical, numerical, and analogical techniques; treatment of convective heat and mass transfer for internal and external flows by dimensional analysis, integral method, and use of analogies between heat, mass, and momentum transport; radiation heat transfer for surfaces and gases; selected topics including combined heat and mass transfer, two phase heat transfer, and high speed flow phenomena.

ME 509. INTERMEDIATE FLUID MECHANICS. Class 3, cr. 3. Prerequisites: ME 310 and MA 302.

Fluid properties, basic laws for a control volume, kinematics of fluid flow, dynamics of frictionless incompressible flow, basic hydrodynamics, equations of motion

for viscous flow, viscous flow applications boundary layer theory, unsteady flow.

ME 510. GAS DYNAMICS. Class 3, cr. 3. Prerequisites: ME 310 and MA 302.

Flow of compressible fluids including one-dimensional gas dynamics, isentropic flow, normal and oblique shocks, and diabatic flow. Two-dimensional compressible flow including irrotational flow, linearized theory and method of characteristics. Shock reflection and interaction.

ME 513. ENGINEERING ACOUSTICS. Sem. 1. Class 3, cr. 3.

The simple oscillator. Free and forced response. Applications to vibration isolation. Transient response. Applications to sonic boom excitation and spacecraft excitation by oscillating shocks. Wave motion in strings and bars. The acoustic wave equation. Sound transmission between two media and through walls. Building acoustics. Acoustic resonators and filters and applications to muffler theory.

ME 528. AIR POLLUTION. Class 3, cr. 3. Prerequisitees: undergraduate thermodynamics and fluid mechanics or consent of instructor. Credit will not be given for both ME 528 and CE 557.

Definition of the air pollution problem. Kinds and sources of pollutants. Meteorology and the transport and movement of pollutants. Methods of controlling the quantities of dust, fumes, and mists generated in industrial processes. Aircraft, truck, and automobile exhausts and the pollution of the atmosphere. Biological and economic aspects of air pollution.

ME 560. KINEMATICS. Class 3, cr. 3. Prerequisite: ME 370.

Geometry of constrained plane motion with applications to linkage design. Type and number synthesis, size synthesis. Graphical, analytical, and computer techniques.

ME 563. MECHANICAL VIBRATIONS. Class 3, cr. 3. Prerequisites: CE 273 and ME 340.

Review of systems with one degree of freedom including the LaPlace transformation. LaGrange's equations of motion for multiple degree of freedom systems. Transfer functions for harmonic response, impulse response, and step response. Convolution integrals for responses to arbitrary inputs. Principle frequencies and modes. Introduction to phase-plane for nonlinear problems. Applications to critical speeds, measuring instruments, isolation, torsional systems.

ME 569. MECHANICAL BEHAVIOR OF MATERIALS. Class 3, cr. 3.

A study of how loading conditions and environmental conditions can influence the behavior of materials in service. Elastic and plastic behavior, fracture, fatigue, low and high temperature behavior. Introduction to fracture mechanics. Emphasis is on methods of treating these conditions in design.

ME 580. NONLINEAR SYSTEMS. Class 3, cr. 3.

Survey of nonlinear problems arising in engineering systems. Differential equation models for nonlinear systems. Exact and approximate solution techniques for nonlinear equations. Stability of nonlinear systems. Phenomena particular to nonlinear systems. Application of analog and digital computers to nonlinear problems.

ME 597. SELECTED TOPICS IN MECHANICAL ENGINEERING. Cr. 1-6. May be repeated for credit.

MSE 576. CORROSION. Class 3, cr. 3. Prerequisite or corequisite: CHM 373 or MSE 411.

Rate-controlling steps in electrode processes; activation, ohmic, and concentration polarization; passivation; potentiostatic studies and alloy design; application to engineering systems.

MSE 597. SELECTED TOPICS IN MATERIALS SCIENCE AND METALLURGICAL ENGINEERING. Hours and credits to be arranged.

MSE 597A. THE PHYSICAL CHEMISTRY OF IRON AND STEEL PRODUCTION. Class 3, cr. 3. Prerequisite: ME 305 and MSE 411 or equivalent.

A study of physical chemistry and thermodynamics applied to iron and steel production. Topics treated include metal-slag equilibria and the reactions of the important steelmaking elements.

MSE 597B. PHASE TRANSFORMATIONS AND PHYSICAL PROPERTIES. Class 3, cr. 3. Prerequisite: MSE 411 or equivalent.

A detailed study of recovery, recrystallization and grain growth in metals and alloys and the correlation of these solid state phenomena with the physical properties of the materials involved. Emphasis is placed on the theoretical principles involved and their industrial applications.

MSE 597C. MECHANICAL BEHAVIOR OF MATERIALS. Class 3, cr. 3. Prerequisite: MSE 411 or equivalent.

The elastic and plastic behavior of materials and correlation of these with structural properties. Performance of materials during industrial deformation processes and fracture.

NUCL 501. NUCLEAR ENGINEERING PRINCIPLES. Class 3, cr. 3. Prerequisite: graduate standing in engineering or consent of instructor.

A first course for graduate students desiring a nuclear engineering sequence. Nuclear structure; nuclear radiations; neutron behavior while slowing down and diffusing; fast and thermal reactor theory; and control.

NUCL 502. NUCLEAR ENGINEERING SYSTEMS. Class 3, cr. 3. Prerequisite: NUCL 501 or equivalent.

Engineering aspects of nuclear power. Materials of construction; fuel and fuel cycles; heat removal; radiation shielding; economics; and nuclear power systems.

NUCL 510. NUCLEAR REACTOR THEORY I. Class 3, cr. 3. Prerequisite: NUCL 501 or equivalent.

Introduction to neutron transport theory; multigroup theory; heterogeneous reactors; and reactor kinetics.

NUCL 520. RADIATION EFFECTS AND REACTOR MATERIALS. Class 3, cr. 3. Prerequisite: NUCL 501; corequisite: NUCL 502.

Introduction to radiation effects in solids and a survey of nuclear reactor materials. Radiation interaction mechanisms and effects on properties. Reactor material characteristics, selection criteria, testing, and economic considerations.

GRADUATE LEVEL

EE 600. RANDOM VARIABLES AND SIGNALS. Class 3, cr. 3. Prerequisite: EE 440 or 483 or graduate standing.

Engineering applications of probability theory. Problems on events, independence, random variables, distribution and density functions, expectations, and characteristic functions. Dependence, correlation, and regression; multivariate Gaussian distribution. Stochastic processes, stationary, ergodicity, correlation functions, spectral densities, random inputs to linear systems; Gaussian processes.

EE 602. LUMPED SYSTEM THEORY. Class 3, cr. 3. Prerequisite: EE 440 or 483 or graduate standing.

Basic methods of modern system theory. Time domain techniques for both linear and nonlinear systems. Characterization of both continuous and discrete-time linear systems in the time and frequency domains. Energy relationships and the restriction that positive energy storage places on physical systems.

EE 604. ELECTROMAGNETIC FIELD THEORY. Class 3, cr. 3. Prerequisite: EE 311 or graduate standing.

Review of general concepts, (Maxwell's equations, materials interaction, boundary conditions, energy flow), statics (LaPlace's equation, Poisson's equation, mapping), distributed parameter systems (classification of solutions, transmission lines and waveguide), radiation and antennas (arrays, reciprocity, Huygen's principle), a selected special topic (e.g., quantum electronics, plasmas, coupled modes, relativity).

EE 606. SOLID STATE AND MAGNETIC DEVICES. Class 3, cr. 3. Prerequisite: EE 402 or graduate standing.

A brief introduction to the theory of solids which is followed by the formulation of the equations for semiconductor devices. The P-N junction theory is formulated and solved for several different conditions illustrating a number of devices. The tunnel diode is studied as an example of tunneling. The transistor is presented with emphasis on microwave, power, switching. The SCR is studied in detail as well as the JFET. Other devices include the IGFET, charge-coupled, Schottky diode, I-C fabrication. Magnetic materials and devices are presented.

EE 654. SEMICONDUCTOR DEVICES. Class 3, cr. 3. Prerequisite: EE 352 or equivalent.

The electrical properties and applications of semiconductor devices.

EE 672. LINEAR PASSIVE NETWORK THEORY. Class 3, cr. 3. Prerequisite: EE 301 or graduate standing.

Passivity. Positive realness. Two element kind one- and two-ports. Darlington's synthesis. The approximation problem. Computer methods of network synthesis. Distributed parameter networks.

EE 676. LINEAR ACTIVE NETWORK THEORY. Class 3, cr. 3. Prerequisite: EE 502 or 544; corequisite: MA 525.

Foundations of linear networks; concepts of passivity, activity, reciprocity, causality, and stability. Scattering matrix

and its application to broadband matching problems. Negative resistance amplifiers. Synthesis of active RC networks. Sensitivity.

EE 680. MODERN CONTROL THEORY. Class 3, cr. 3. Prerequisite: EE 502 or 583.

Discussion of basic theoretical methods in modern control theory. Topics include parameter optimization techniques, maximum principle and dynamic programming approaches to optimal control problems, second variation technique and sufficient conditions, singular control and introduction to adaptive control.

EE 685. DIGITAL PROCESS CONTROL AND MATHEMATICAL MODELING OF INDUSTRIAL SYSTEMS. Class 3, cr. 3. Prerequisite: EE 483 or equivalent.

This course describes the present status of automatic control in industry with emphasis on the application of digital control. Problems involved in the use of both supervisory and direct digital control systems will be presented and the development of process mathematical models will also be covered.

ME 614. ADVANCED GAS DYNAMICS. Class 3, cr. 3.

ME 652. ROCKET JET PROPULSION. Class 3, cr. 3.

ME 660. ADVANCED KINEMATICS. Class 3, cr. 3.

ME 663. ADVANCED MECHANICAL VIBRATIONS A. Class 3, cr. 3.

ME 664. ADVANCED MECHANICAL VIBRATIONS B. Class 3, cr. 3.

INDUSTRIAL EDUCATION—See Department of Manufacturing Technology

INDUSTRIAL ENGINEERING TECHNOLOGY—See Department of Manufacturing Technology

INDUSTRIAL MANAGEMENT—See Department of Administrative Sciences

DEPARTMENT OF MANUFACTURING TECHNOLOGY

Charles E. Columbus, Head

FACULTY: G. E. Bock (Emeritus), C. E. Columbus, G. E. DeGraff, J. E. Deuel, E. C. Gallett, B. A. Hindmarch, A. L. Kaye (Emeritus) R. F. McCormick, D. E. Norris, A. J. Parker, P. Perkins, C. D. Rose

The Department of Manufacturing Technology provides career educational opportunities to students whose interests and aptitudes lie in one of the following areas:

1. Industrial Education (IED), four year bachelor of science degree in Technology Teaching or Vocational-Industrial Teaching in cooperation with the Department of Industrial Education at the Lafayette campus.
2. Industrial Engineering Technology, (IET), two year associate degree, plus two year add-on bachelor of science degree—ECPD accredited programs.
3. Mechanical Drafting and Design Technology, (MDT), two year associate degree.

4. Mechanical Engineering Technology, (MET), two year associate degree, plus two year add-on bachelor of science degree—ECPD accredited programs.
5. Supervision, (SPV), two year associate degree, and a bachelor of science degree.

A degree in Manufacturing Engineering Technology is not offered. However a student in either Industrial Engineering Technology or Mechanical Engineering Technology by proper selection of electives during the junior and senior years will be well qualified and job ready in this area.

Certificate Programs are available. These programs are designed primarily for the mature, part-time student whose interest lies in a particular area. Presently two such programs are offered.

1. Mechanical Instrumentation Systems Program under Mechanical Engineering Technology (MET).
2. Professional Supervision under Supervision (SPV).

All programs offered by the Department are available to the part-time student who wishes to continue his educational objective.

Co-op work programs with industry or other organizations may be made available to students on an individual basis.

ADMISSION REQUIREMENTS

1. Admission to associate degree programs and four year bachelor of science programs.

a. Graduate from a High School accredited by the State Department of Education.

Record must include a minimum of:

1 unit Algebra
1 unit Plane Geometry
1 unit Laboratory Science
6 units of English
1 unit Social Studies
total of not less than 15 units

b. Be in the upper two-thirds of high school graduating class or have SAT scores (V+M) totaling 800 or above (ACT composite totaling 18 or above).

c. Those who have not completed a full year of accredited college work are required to take College Board Scholastic Aptitude Test (SAT) and College Board Achievement Tests in English, mathematics and one science or comparable American College Tests (ACT). These requirements may be waived for adults who have been out of high school for some time and those returning from military service.

d. All new students including transfer or re-entry who have not received credit in ENGL 104, English Composition (or equivalent) are required to take the College Entrance Board (CEEB) test in English prior to being placed in an English Course.

2. Admission to two year add-on bachelor of science programs require an associate degree from an accredited educational institution and the approval of the Department Head. Those transferring into ECPD accredited programs from other institutions or programs not accredited by ECPD may be required to take additional courses in their junior and senior years. These will be specified at time of acceptance in the program by the Department Head.
3. Transfer students from another accredited institution except Purdue University including its Regional Campuses must have a C Average or better and must be in good academic standing at the college or colleges previously attended. A separate transcript must be received from each institution attended regardless of whether credit is requested.
4. Admission to Certificate Programs varies as to type and objective of the program.

PASS/NOT PASS OPTION

Pass/Not Pass Option will be authorized only for certain General Education electives and then only when the student's academic advisor is in agreement that this appears to be a desirable course for the student to pursue in this particular case.

PLANS OF STUDY
INDUSTRIAL EDUCATION

Program offered by Andrew F. Parker, Sr.

The Industrial Education section of the Department of Manufacturing Technology is concerned with one or more programs and activities designed to equip men and women for entrance into career fields that require an intellectual base upon which practical applications of the knowledge gained in the humanities, the sciences, and the technologies depend. Thus, the courses provided offer a combination of theoretical and practical education.

Graduate and undergraduate programs which prepare students for entrance into a variety of careers in education, government, and industry are available. Students may elect to pursue a major which will lead to the degree of Bachelor of Science in Industrial Education with a specialty in one of the following areas:

1. Vocational-Industrial Teaching
2. Technology Teaching
3. Industrial Arts Teaching

The Nature of Industrial Education

Industrial education prepares people for work and living in the industrial society. Public schools offer instruction in this field under the general classifications of industrial arts and vocational-industrial education. Vocational-technical schools offer industrial education opportunity with emphasis on occupational preparation. Industry, business, and government have become involved in and committed to programs of industrial education and training.

Vocational-Industrial Teaching

Vocational-industrial teaching, also known as trade and industrial teaching, is a part of the total Indiana program of vocational eduction. Vocational-industrial teachers must be occupationally competent in one of the many skilled and technical crafts found in industry in the United States. In order to qualify for the vocational teaching license, the student must have completed at least three years of work above the learner level, in a craft, skilled trade, or some other type of industrial occupation, plus the general and professional education courses specified by the Teacher Training and Licensing Commission of the State Board of Education. The plan of study, when completed, entitles the student to a full-time provisional trade and industrial education teacher license.

A qualified graduate may find employment in day-trade-vocational programs in a public high school, in an area vocational-technical center, or in one of a variety of institutions (including private) which are coming into prominence. He may serve as either a craft or occupational instructor or as a teacher of related subjects. He may, in addition, be called upon to teach apprentices or workers who attend part-time or evening-school classes. By completing one additional specified course he may be certified as a cooperative vocational education coordinator. Increasingly, demands are made upon the qualified vocational-industrial teacher to help adults to prepare themselves for work in occupations with which they are not familiar and in which there are shortages of trained workers.

Technology Teaching

The scientific and technological revolutions currently underway have created an increasing number of new engineering-related occupations in which the workers often are called technicians. The establishment and refinement of these occupations demand a kind of teacher who also is new to the scene. The Department offers a major, technology teaching, designed to prepare students to become instructors of technical subjects in post-high school, industrial-technical curricula. Entry into this program of teacher education is based upon completion of a two-year college level, technical program leading to a degree comparable to Purdue's Associate in Applied Science.

Formal technical training, work experience, professional courses, general studies, and advanced technical preparation are considered necessary for teachers in technological specialties. The technology teaching major requires a balance of these components within a 131-semester-hour program of undergraduate study.

Industrial Arts Teaching

Industrial arts, as a subject in public schools, deals with industrial aspects of our culture, emphasizing tools, materials, processes, and products of contemporary American industry. Problems of industrial production, planning, and maketing are considered from the viewpoints of labor, management, and the consumer. Social problems related to industrial production and to technological change are integral parts of the subject matter of industrial arts. A part of the formal program of general education, industrial arts is most often included in the junior and senior high school curricula.

Graduate Study in Industrial Education

The Department of Industrial Education at the Lafayette Campus provides courses and directs research leading to the M.S. and Ph.D. degrees. Special programs of graduate study may be designed for persons who do not have an advanced degree objective but who are concerned about improving their professional qualifications or meeting advanced certification requirements. Such programs are currently available which meet the certification requireemnts for industrial cooperative education coordinators and for supervisors of trade and industrial education.

Admission to the Graduate School may be granted to graduates of Purdue University or of any other accredited institution. Persons accepted to do advanced study in industrial education must present adequate undergraduate preparation and experience to make graduate study a profiitable undertaking.

BACHELOR OF SCIENCE DEGREE IN INDUSTRIAL EDUCATION

Each student's program will be based on the major which he has selected. Modifications may be made from time to time to fit individual needs, but in the main the plans of study outlined below will apply in each case.

Purdue University has been designated by the State Board of Vocational Education as a teacher-training institution in vocational trade and industrial education in accordance with the provisions of the federal vocational educational acts. The various industrial education options fulfill the professional training requirements specified by the Indiana State Teacher Training and Licensing Commission for teaching certificates in the field of industrial education.

In order to qualify for the degree of Bachelor of Science in Industrial Education the student must:

1. Complete the curriculum requirements in industrial education as listed in the plans of study which follow, with a selection of electives appropriate to a major area of specialization
2. Complete at least 128 semester hours of course work
3. Present evidence of industrial work experience when such is required in certain curricula.

Vocational-Industrial Teaching

The prime purpose of this plan of study is to prepare individuals as teachers of vocational-industrial-technical subjects. Certification procedures require that such teachers be competent in the particular trade or occupation for which they are certified. Competency must be verified in terms of past occupational experience (usually three years beyond the learner level) or by controlled experience gained in a cooperative plan which is offered as an integral part of an undergraduate curriculum. Thus, there are two tracks to this plan of study. One track involves "demonstrated trade competency" based upon past occupational experience for which the student may be granted up to 32 semester hours of credit toward his degree. This may shorten the time to earn the degree to approximately three years. The other track provides opportunity for the individual to gain his occupational competency through

"cooperative occupational internship" as a part of his degree requirement and gain a like amount of credit. This track requires five full calendar years for completion since it includes 30 months with industry.

Persons interested in pursuing either of these plans should consult the Department for a full explanation of details and procedures.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	MA 153 (Algebra and Trigonometry I)	(3)	MA 154 (Algebra and Trigonometry II)
(3)	SOC 100 (Introduction to Sociology)	(3)	ECON 210 (Principles of Economics)
(1)	IED 110 (Introduction to Industrial Education)	(3)	Social and Behavioral Sciences elective
(3)	PSY 120 (Elementary Psychology)	(3)	Technical elective
(3)	Technical elective	(1)	Humanities elective
(16)		(16)	

FIRST SUMMER SESSION

(3) IED 362 (Cooperative Occupational Internship)**

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(5)	IED 362 (Cooperative Occupational Internship)**	(4)	PHYS 218 (General Physics I) or (3) CHM 111 (General Chemistry)
		(3)	IED 260 (Principles and Objectives of Industrial Education)
		(3)	COM 114 (Fundamentals of Speech Communication)
		(3)	General education elective
		(3)	Technical elective
		(15-16)	

SECOND SUMMER SESSION

(3) IED 362 (Cooperative Occupational Internship)**

** IED 462 (Appraisal of Occupational Experience and Competency) may be substituted.

JUNIOR YEAR*

Fifth Semester	Sixth Semester
(5) IED 362 (Cooperative Occupational Internship)**	(4) PHYS 219 (General Physics II) or (3) CHM 112 (General Chemistry) PHIL 110 (Introduction to Philosophy) OR PHIL 150 (Principles of Logic) (3) ED 285 (Educational Psychology) (3) Humanities elective (2) Social and Behavioral Science elective
	(15-16)

THIRD SUMMER SESSION

(3) IED 362 (Cooperative Occupational Intership)**

COOPERATIVE YEAR

Seventh Semester	Eighth Semester
(5) IED 362 (Cooperative Occupational Intership)**	(5) IED 362 (Cooperative Occupational Internship)**

FOURTH SUMMER SESSION

(3) IED 362 (Cooperative Occupational Internship)**

SENIOR YEAR

Ninth Semester	Tenth Semester
(3) IED 375 (Teaching Methods in Occupational Education)	(3) IED 510 (Course Development in Industrial and Occupational Education)
(3) ED 485 (The American School System)	(3) IED 444 (Occupational Analysis for Curriculum Planning)
(2) ED 304 (Principles of Teaching)	(3) IED 467 (School Shop Management)
(3) General education science elective	(8) ED 464 (Supervised Teaching in Industrial Education Subjects)
(3) Technical elective	
(2) Electives	
(16)	(17)

Technology Teaching

Graduates of this major will be equipped to teach future technicians who will serve principally as assistants to scientists and engineers. Degree requirements have been established in line with the basic qualifications necessary for effective teaching performance. The program will provide a sound base for

* Students must be admitted to the program for the preparation of teachers before being permitted to register for education courses.

** IED 462 (Appraisal of Occupational Experience and Competency) may be substituted.

professional growth of career teachers in chemical, civil, electrical, and electronic, industrial, mechanical technologies, and other technologies.

Only selected graduates from accredited two-year, college level, technician training programs are eligible for admission to the major. Transfer students are given credit for appropriate courses, satisfactorily completed in the two-year institution. As much as 78 semester hours transfer credit may be applied toward the course requirements for graduation, including general studies, mathematics, science, electives, and technical credits.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	MA 153 (Algebra and Trigonometry I)	(3)	MA 154 (Algebra and Trigonometry II)
(3)	SOC 100 (Introduction to Sociology)	(3)	PSY 120 (Elementary Psychology)
(1)	IED 110 (Introduction to Industrial Education)	(6)	Technical Specialty Credit
(6)	Technical Specialty Credit		
(16)		(15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	PHYS 218 (General Physics I) or (3) CHM 111 (General Chemistry)	(4)	PHYS 219 (General Physics II) or (3) CHM 112 (General Chemistry)
(3)	MA 223 (Introductory Analysis I)	(3)	COM 114 (Fundamentals of Speech Communication)
(9)	Technical Specialty Credit	(9)	Technical Specialty Credit
(15-16)		(15-16)	

JUNIOR YEAR*

Fifth Semester		Sixth Semester	
(3)	IED 260 (Principles and Objectives of Industrial Education)	(2)	ED 304 (Principles of Teaching)
(3)	PHIL 110 (Introduction to Philosophy) OR PHIL 150 (Principles of Logic)	(3)	ECON 210 (Principles of Economics)
(4)	Humanities elective	(3)	Social and Behavioral Science elective
(3)	Advanced technical elective†	(1)	General education elective
		(3)	ED 285 (Educational Psychology)
		(3)	Advanced technical elective†
(13)		(15)	

* Students must be admitted to the program for the preparation of teachers before being permitted to register for education courses.

† A minimum of nine semester hours technical course work beyond the associate degree will be selected from upper-division technology courses and other offerings of the University.

COOPERATIVE YEAR

Seventh Semester		Eighth Semester	
(5)	IED 362 (Cooperative Occupational Internship)‡	(5)	IED 362 (Cooperative Occupational Internship)‡

SENIOR YEAR

Ninth Semester		Tenth Semester	
(3)	IED 375 (Teaching Methods in Occupational Education)	(3)	IED 510 (Course Development in Industrial and Occupational Education)
(3)	ED 485 (The American School System)	(3)	IED 444 (Occupational Analysis for Curriculum Planning)
(2)	General Education elective	(3)	IED 467 (School Shop Management)
(2)	Social and Behavioral Science elective	(8)	ED 464 (Supervised Teaching in Industrial Education subjects)
(3)	Advanced technical elective†		
(13)		(17)	

Industrial Arts Teaching

Prospective teachers of industrial arts study a broad core program of general education subjects essential for all teachers. In addition they develop technical competencies which will enable them to present effective instruction covering a broad range of industrial tools, materials, and processes. They complete a sequence of professional education courses including study of the American school system, educational psychology, methods of teaching, organization of instructional materials, and student teaching. Industrial arts teacher education at Purdue University also offers the individual student an opportunity to acquire a degree of specialization in one or more of the technical subject areas.

Complete program at West Lafayette only; transfer to West Lafayette Campus recommended after freshman year.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(5)	MA 150 (Mathematics for Technology)	(3)	Social and Behavioral Science elective
(3)	PSY 120 (Elementary Psychology)	(3)	SOC 100 (Introduction to Sociology)
(3)	ECON 210 (Principles of Economics)	(3)	Philosophy elective
(1)	ENGL 185 (Developmental Reading)	(3)	Humanities elective
(15)		(15)	

‡ IED 462 (Appraisal of Occupational Experience and Competency) may be substituted.

† A minimum of nine semester hours technical course work beyond the associate degree will be selected from upper-division technology courses and other offerings of the University.

SOPHOMORE YEAR

Third Semester

(3) COM 114 (Fundamentals of Speech Communication)
(3) CHM 111 (General Chemistry)
(3) ED 285 (Educational Psychology)
(3) Social and Behavioral Science elective
(3) Humanities elective

(15)

INDUSTRIAL ENGINEERING TECHNOLOGY

Program Coordinator, C. D. Rose

This field is designed to develop technicians to support the problem-solving and decision-making functions in management and to prepare for technological services in such industrial areas as production planning and control, work method analysis, work measurements, quality assurance and controls, and systems and procedures analysis. Practical applications of production-oriented operations, research techniques, data processing, and computer programming fundamentals are stressed. As an industrial engineering technician is concerned with an organization which has human dimensions at least as important as the technical ones this aspect is also stressed throughout the curriculum.

The industrial engineering technician is often initially employed in the time study, quality control, stock control or factory layout department. As he gains experience he may advance within the department directly assisting a professional industrial engineer or become a supervisor. This broad technical background together with the human relations background and a proficiency in engineering and mathematics enables the industrial engineering technician to take advantage of opportunities for advancement in many directions.

A.A.S. DEGREE IN INDUSTRIAL ENGINEERING TECHNOLOGY

An ECPD accredited engineering technology curriculum

The two-year curriculum leads to the degree of Associate in Applied Science. An additional two years of study may lead to a Bachelor of Science degree.

The two-year program prepares students to take jobs doing motion study and work simplification, time study and work measurement, quality control and inspection, job evaluation, plant layout, production control, and cost and savings analyses work.

The program of study shown below is designed to give specialized study in methods improvement, materials handling, quality control, production, and general options as selected by the student.

FRESHMAN YEAR

First Semester

(2) EG 114 (Drafting Fundamentals)
(3) IET 104 (Industrial Organization)
(1) MET 100 (Applied Engineering Computations)
(4) PHYS 218 (General Physics)
(3) MA 147 (Algebra & Trig I)
(3) ENGL 104 (English Composition)

(16)

Second Semester

(3) IET 204 (Techniques of Maintaining Quality)
(3) CPT 200 (Computer Programming Fundamentals)
(3) ECON 210 (Principles of Economics)
(2) MET 335 (Basic Machining)
(4) PHYS 219 (General Physics)
(3) MA 148 (Algebra & Trig II)

(18)

SOPHOMORE YEAR

Third Semester

(3) STAT 301 (Elementary Statistical Methods)
(3) IET 224 (Production Planning and Control)
(3) IET 262 (Motion Study and Work Methods)
(3) SPV 252 (Human Relations in Industry)
(2) IET 220 (Critical Path Analysis)
(3) Technical elective

(17)

Fourth Semester

(3) ENGL 220 (Technical Report Writing)
(3) IET 250 (Fundamentals of Production Cost Analysis)
(3) IET 266 (Work Measurement and Incentives)
(3) COM 114 (Fundamentals of Speech Communication)
(4-6) Technical electives

(16-18)

TECHNICAL ELECTIVES

Methods Improvement Option

(3) IET 120 (Systems and Procedures)
(2) IET 272 (Job Evaluation)
(2) IET 296 (Industrial Technology Case Problems)

Material Handling Option

(3) IET 268 (Plant Layout)
(3) IET 312 (Materials Handling)
(2) IET 296 (Industrial Technology Case Problems)

Quality Control Option

(3) STAT 402 (Elementary Statistics Methods II)
(2) IET 354 (Attribute and Variable Sampling)
(3) IET 364 (Total Quality Control)

Supervision Option

(3) SPV 331 (Occupational Safety and Health)
(3) SPV 374 (Supervision)
(3) SPV 376 (Personnel Problems in Industry)

General Option: As arranged with counselor

B.S. DEGREE IN INDUSTRIAL ENGINEERING TECHNOLOGY

An ECPD accredited engineering technology curriculum

Graduates of the two-year industrial engineering technology program are eligible for admission to this two year "add-on" curriculum.

This curriculum is designed to develop technicians to support the problem-solving and decision-making functions in management and to prepare students

for technological services in such industrial engineering areas as production planning and control, work methods analysis and work measurement, quality assurance and control, cost analysis, and systems and procedures analysis. Practical application of production oriented operations, research techniques, data processing, and computer programming fundamentals are stressed. The essentials of management with which foremen, supervisors, and administrative personnel are concerned are covered.

JUNIOR YEAR

Fifth Semester

(3) MA 221 (Calculus for Technology I)
(2) EET 216 (Materials and Controls)
(2) MET 380 (Materials and Processes)
(1) ENGL 185 (Developmental Reading)
(3) SPV 474 (Conference Leadership)
(3) English elective
(3) IET elective

(17)

Sixth Semester

(3) MA 222 (Calculus for Technology II)
(3) SPV 374 (Industrial Supervision)
(3) ENGL 421 (Business Writing: Engineering Applications)
(3) Technology elective
(3) IET elective
(3) SPV 375 (Basic Methods of Industrial Training)

(18)

SENIOR YEAR

Seventh Semester

(3) MET 400 (Power Systems)
(4) MET 412 (Mechanics of Materials)
(3) COM 315 (Speech Communication of Technical Information)
(3) HSSE elective
(3) Supervision elective
(2) IET elective

(18)

Eighth Semester

(3) COM 415 (Discussion of Technical Problems)
(3) IET 497 (Senior Project)
(3) Technology elective
(3) HSSE elective
(3) IET elective

(15)

A.A.S. DEGREE IN MECHANICAL DRAFTING DESIGN TECHNOLOGY

This program is intended to prepare senior draftsmen and junior design draftsmen for employment in manufacturing and construction industries, government, utilities, and other service firms. In addition, graduates will be prepared to make industrial illustrations for parts manuals, brochures, proposals, and assembly instructions.

Mechanical drafting design technology concerns matters such as the preparation of sketches and drawings for design proposals, experimental models, prototype configurations, and production parts and assemblies.

Graduates of this program may perform drafting design functions such as the development of the design of a sub-assembly or major component under the direction of an engineer or an engineering technologist.

With additional experience, promotion to checker, designer, or drafting supervisor is possible. Also, this program is sufficiently broad to allow for progression into a variety of other technical or supervisory positions.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	MA 147 (Algebra and Trigonometry for Technology I)	(3)	MA 148 (Algebra and Trigonometry for Technology II)
(1)	MET 100 (Applied Computations)	(2)	MET 180 (Materials and Processes)
(2)	EG 114 (Drafting)	(2)	MET 335 (Basic Machining)
(3)	MET 105 (Introduction to Engineering Technology)	(2)	MET 210 (Applied Statics)
(4)	PHYS 218 (General Physics)	(3)	MET 156 (Graphical Computations)
(1)	ENGL 185 (Developmental Reading)	(3)	ENGL 104 (English Composition)
(14)		(15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MET 257 (Interdisciplinary Drafting)	(3)	MET 299B (Tool Design)
(3)	MET 330 (Introduction to Fluid Power)	(3)	MET 340 (Piping and Plumbing Design)
(3)	MET 204 (Production Drawing)	(4)	MET 216 (Machine Elements)
(4)	MET 211 (Applied Strength of Materials)	(3)	MET 200 (Power Systems)
(3)	MET 232 (Dynamics)	(3)	EG 317 (Production Illustration)
(16)		(16)	

Note: Special plan of study available for those desiring to pursue degree objective on a part time basis (9 credit hours or less per semester)

A.A.S. DEGREE IN MECHANICAL ENGINEERING TECHNOLOGY

An ECPD accredited engineering technology curriculum

This program is intended to prepare specialists for the development of machines and products, for production processes, for the installation and maintenance of machines, and for solving practical engineering problems.

Mechanical engineering technology is concerned with the generation, transmission, and utilization of mechanical and fluid energy and the design and production of tools and machines and their products.

Graduates of the program accept jobs as laboratory technicians, engineering aides, plant maintenance men, layout men, production assistants, and technical salesmen. With additional experience, promotion to positions such as industrial supervisors, machine and tool designers, technical buyers, production expeditors, and cost estimators is possible.

Graduates of the associate degree program in mechanical engineering technology are eligible for certification as associate engineering technicians.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	MA 147 (Algebra and Trigonometry for Technology I)	(3)	MA 148 (Algebra and Trigonometry for Technology II)
(4)	PHYS 218 (General Physics)	(4)	PHYS 219 (General Physics)
(1)	MET 100 (Applied Computations)	(2)	MET 210 (Applied Statics)
(2)	EG 114 (Drafting)	(2)	MET 180 (Materials and Processes)
(3)	MET 105 (Introduction to Engineering Technology)	(3)	ENGL 104 (English Composition)
(1)	ENGL 185 (Developmental Reading)	(2)	MET 335 (Basic Machining)
(14)		(16)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MA 221 (Calculus for Technology I)	(3)	ENGL 220 (Technical Report Writing)
(4)	MET 211 (Applied Strength of Materials)	(3)	COM 114 (Fundamentals of Speech Communications)
(3)	MET 330 (Introduction to Fluid Power)	(3)	MET 200 (Power Systems)
(3)	MET 232 (Dynamics)	(4)	MET 216 (Machine Elements)
(3)	MET 204 (Production Drawing)	(3)	MET elective
(16)		(16)	

B.S. DEGREE IN MECHANICAL TECHNOLOGY

An ECPD accredited engineering technology curriculum

Graduates of two-year mechanical engineering technology program are eligible for admission to this two-year "add-on" curriculum.

This baccalaureate program prepares graduates to fill technical positions in manufacturing and production industries such as production supervisor, plant engineer, tool engineer and project engineer.

With a detailed knowledge of the relevant practices, procedures, and codes, graduates of this program become important components in today's industrial society. In some employment situations they assist the engineer or scientist in the creation, design, and production of devices and systems. In other employment situations they perform the above functions largely or completely on their own. Their ability to communicate together with their knowledge of the basic theories and the understanding of their application to the reality of industrial practice provides an exciting and expanding future.

The plan of study provides for the broadening of the associate degree graduate in communications, interpersonal relations, supervision techniques, and associated technical areas.

JUNIOR YEAR

Fifth Semester

(4) EET 102 (Electrical Circuits I)
(3) CS 210 (Introduction to Data Processing) or CPT 200 (Computer Programming Fundamentals)
(3) ENGL 421 (Business Writing: Engineering Applications)
(3) ECON 210 (Principles of Economics)
(3) Technical specialty elective

(16)

Sixth Semester

(4) EET 152 (Electrical Circuits II)
(3 or 4) Science elective
(3) HSSE elective
(3) SPV 252 (Human Relations in Industry)
(3) Technical specialty elective

(16 or 17)

SENIOR YEAR

Seventh Semester

(4) EET 212 (Electrical Power and Machinery)
(3 or 4) Science elective
(3) COM 315 (Speech Communications of Technical Information)
(3) IET 450 (Production Cost Analysis)
(3) Technical specialty elective
(1) MET 495 (Senior Project Survey)

(17 or 18)

Eighth Semester

(3) IET 224 (Production Planning and Control)
(3) HSSE elective
(3) COM 415 (Discussion of Technical Problems)
(3) MET 497 (Senior Project)
(3) Technical specialty elective

(15)

Note: Technical specialty elective: a four course sequence of technical courses selected to meet the students educational objective as approved by Department Head.

SUPERVISION

Program Coordinator, B. A. Hindmarch

Undergraduate programs in Supervision are designed to prepare students for careers in supervisory management, personnel work, and employee training and development. These careers are found in such organizations as businesses, educational institutions, government agencies, hospitals, and industrial firms. Supervision graduates are employed in these organizations in such positions as supervision, personnel, training and development, customer service, field engineering, plant engineering, production control, production engineering, process engineering, programming, project engineering, purchasing, quality control, sales, and technical writing.

Two programs are offered, one leading to an Associate Degree in Applied Science and one for a Bachelor of Science Degree.

A.A.S. DEGREE IN PROFESSIONAL SUPERVISION

This program is designed to meet the needs of individuals who wish to improve their skills as supervisors as well as their general educational base.

Recognizing there are many different types of industries and different supervision needs, a student's program is planned jointly by the individual and an academic adviser.

The curriculum is college level, culminating in the awarding of the Associate in Applied Science degree. Graduates of the program are eligible to continue toward a Bachelor of Science degree in supervision.

General Plan of Study

CORE

Course Number	Course Description	Credit Hours
SPV 252	(Human Relations in Supervision)	3 hours
SPV 331	(Occupational Safety & Health)	3 hours
IET 104	(Industrial Organization)	3 hours
SPV 374	(Elements of Supervision)	3 hours
	Total	12 hours

COMMUNICATIONS AREA

English composition or speech	3 hours
Any area in communications	3 hours
Total	6 hours

FUNCTIONAL AREA

Recognizing that supervisors work in various functional areas, each supervisor will be expected to select one or more groups of courses that are designed to increase effectiveness on the job. The following are some examples of existing functional areas.

Quality Control	Labor Relations
Methods Improvement	Mechnical Engineering Technology
Materials Handling	Electrical Utilities
Production Planning	Electrical In-Plant Distribution
Personnel Relations	Industrial Engineering Technology

Total ..... 15 credit hours

SUPPORTIVE AREA

Supervisors should have a balanced education experience. Therefore, they should take certain technical and nontechnical courses. Some of the more typical courses considered applicable are listed below:

Nontechnical

INDM	200	(Introductory Accounting)
INDM	201	(Cost Accounting)
SOC	100	(Introductory Sociology)
PSY	120	(Elementary Psychology)

ENGL 220 (Technical Report Writing)
ECON 210 (Principles of Economics)
SPV 375 (Basic Methods of Training for Supervisors)
SPV 376 (Personnel and Personnel Problems)
IET 250 (Fundamentals of Production Cost Analysis)

Requirements ..... 12-18 credit hours

Technical

MA 147 and 148 (Algebra and Trigonometry for Technology I and II)
CHM 111 and 112 (General Chemistry)
PHYS 218 (General Physics)
MET 100 (Applied Engineering Calculations)

Engineering and technology courses to be selected on the basis of the individual's career objectives and qualifications

Requirements ..... 12-18 credit hours
Grand Total ..... 62 credit hours

B.S. DEGREE IN SUPERVISION

FRESHMAN YEAR

First Semester

(6) Technical Skills Electives
(3) ENGL 104 (English Composition I)
(1) SPV 100 (Supervision Lectures)
(3) MA 147 (Algebra and Trigonometry for Technology I)
(3) Elective

(16)

Second Semester

(3) Technical Skills Electives
(3) ENGL 105 (English Composition II)
(3) PSY 120 (Elementary Psychology)
(3) SOC 100 (Introductory Sociology) *or* SOC 312 (American Society)
(3) COM 114 (Principles of Speech)
(3) MA 148 (Algebra and Trigonometry for Technology II)

(18)

SOPHOMORE YEAR

Third Semester

(3) Technical Skills Elective
(3) ECON 210 (Principles of Economics)
(3) Communication Selective
(3) SPV 262 (Supervised Work Experience)
(3) Math/Science Selective

(15)

Fourth Semester

(3) SPV 374 (Elements of Supervision)
(3) Technical Skills Elective
(3) IE/IET Selective
(3) INDM 200 (Introductory Accounting)
(3) Math/Science Selective

(15)

JUNIOR YEAR

Fifth Semester

(3) SPV 375 (Basic Methods of Training for Supervision)
(3) INDM 201 (Cost Accounting)
(3) SPV 331 (Occupational Safety and Health)
(4) PHYS 218 (General Physics)
(3) Technical Skills Elective

(16)

Sixth Semester

(3) Elective
(3) IE/IET Selective
(3) INDM 431 (Personnel Relations)
(3) Introductory CS/CPT course
(3) Elective

(15)

SENIOR YEAR

Seventh Semester

(3) INDM 430 (Labor Relations)
(3) IE/IET Selective
(4) SPV 474 (Conference Leadership Training)
(3) ENGL 421 (Business Writing: Engineering Applications)
(3) SPV 376 (Supervision and Personnel Problems)

(16)

Eighth Semester

(3) SPV 574 (Managerial Training and Development)
(3) SOC 416 (Industrial Sociology)
(3) Elective
(3) Elective
(3) Elective

(15)

CERTIFICATE PROGRAMS

Professional Supervision

The professional supervision certificate program is an intensive and practical curriculum equivalent to 36 semester hours. It is intended to provide supervisors with the professional education needed to handle the many supervisory and technical problems which they meet daily in technical, communications, and human relations fields.

The program has been set up by representatives of industry, professional supervisor's organizations, and the Supervision Program Coordinator. It is designed to meet the needs of management, which is vitally concerned with training supervisors for positions of leadership. Enrollment is on the basis of a program worked out with the counselor assigned and carefully tailored to individual needs.

Students admitted in the temporary classification may qualify for the certificate in professional supervision by taking approved undergraduate level, lower-division technology courses for which their admission classification establishes eligibility and for which they have necessary prerequisites. Appropriate credits earned in this program while in the temporary student classification may be used for credit toward an Associate in Applied Science degree (particularly the Associate in Applied Science degree in professional supervision) under rules governing reclassification as a regular student.

Required Courses

(3) IET 104 (Industrial Organization)
(3) ENG 185 (Developmental Reading)
(3) SPV 252 (Human Relations in Supervision)
(3) COM 114 (Fundamentals of Speech Communication)

Optional Courses

Group I—14 semester hours maximum	Hours Maximum
Communications	10
English and report writing	7
Advanced courses in interpersonal communication (Speech)	3
Economics and labor relations	6
Physical sciences	12

Group II—8 semester hours maximum

Courses specific to two-year certificate curricula 8

Courses from one or more technologies may be elected in this group previded (1) they relate directly to the individual's duties, responsibilities, or line of promotability and (2) prior approval of the counselor and the head of the department administering the program is obtained.

MANAGEMENT EXPERIENCE

(Equivalent to 12 semester hours)

Before receiving the Professional Supervision Certificate, the candidate must have had two years of successful experience in the management field. Satisfaction of this requirement is met by a confirming letter from the managerial employer under whom the candidate worked. Formal credit is not established for this work, but it is treated as equivalent to 12 semester hours of credit in the professional supervision program.

Mechanical Instrumentation Systems Program

Industry now assigns a large portion of the burden of monitoring and controlling manufacturing processes, including associated pollution control, to automatic regulators and controllers. Such regulators may be pneumatic, mechanical, hydraulic, or electrical. Most often it is a combination of two or more. Instrumentation thus covers a very wide field. In addition to electrical circuitry and electronic elements an industrial instrumentation technician must be familiar with the basic principles and practices of pneumatic, mechanics, and hydraulics as associated with sensing changes and controlling processes.

A two-year, four-semester Mechanical Instrumentation Systems Certificate Program is therefore offered by the Department for those meeting one of the following requirements:

1. Has completed the Practical Industrial Electronics Certificate Program
2. Has industrial experience in electrical circuitry and electronic elements including synchros
3. Holds an associate or bachelor degree in engineering technology. (Credit will be given for Physics.)

As this is a noncredit practical program admission will be granted to those who can profit by the courses offered. The University reserves the right to limit enrollment in the courses. The two-year program follows.

Certificate Units	Course Number and Title	
		FIRST YEAR
		First Semester
(4)		(Basic Physics)
		Second Semester
(3)	MET 384	(Instrumentation)
		SECOND YEAR
		First Semester
(3)	MET 485	(Control Systems Components)
		Second Semester
(3)	MET 486	(Control Systems Analysis)

INDUSTRIAL EDUCATION

UNDERGRADUATE LEVEL

IED 110. INTRODUCTION TO INDUSTRIAL EDUCATION. Class 1, cr. 1.

Overview of industrial education with emphasis upon its function and structure in industry and the public school.

IED 260. PRINCIPLES AND OBJECTIVES OF INDUSTRIAL EDUCATION. Class 3, cr. 3. Prerequisite or corequisite: IED 110.

Historical, legislative, and theoretical foundations of industrial education; objectives of the various types of schools and programs.

IED 362. COOPERATIVE OCCUPATIONAL INTERNSHIP. Cr. 3-5. May be repeated to a maximum of 32.

Organized and supervised experience directed toward occupational competence in a specified skilled or technical occupation or staff position as required for vocational teacher certification, applied technology teaching, or industrial supervisory and personnel positions. Planned and supervised by departmental staff in cooperation with business, industry, labor, government, and other employing organizations and agencies. Consent of department required.

IED 375. TEACHING METHODS IN OCCUPATIONAL EDUCATION. Class 3, cr. 3.

Development of competencies in the use and appraisal of the basic methods of teaching occupational subjects. Appropriateness, advantages, and limitations of specific methods.

IED 444. OCCUPATIONAL ANALYSIS FOR CURRICULUM PLANNING. Class 3, cr. 3. Prerequisite: Permission of instructor.

Study and application of the principles and techniques of analyzing a trade or occupation. Special emphasis is given to the identification of teachable content for the development of vocational-technical curricula and courses.

IED 462. APPRAISAL OF OCCUPATIONAL EXPERIENCE AND COMPETENCY. Cr. 0-32 departmental credit.

Industrial, trade, technical or other occupational experience will be evaluated and a maximum of 32 semester hours credit may be granted. Full credit will be considered only for those candidates who have a minimum of three years appropriate occupational experience and who meet the minimum occupational requirement for vocational certification as established by the Indiana State Plan for Vocational Education. Areas of weakness may be strengthened through enrollment in laboratory courses and/or in IED 362 as required by the adviser.

IED 467. SCHOOL SHOP MANAGEMENT. Class 3, cr. 3.

The school shop and drawing room, including equipment and management.

Layout, selection, and arrangement of equipment and supplies; methods of organization and management.

DUAL LEVEL
Undergraduate-Graduate

IED 510. COURSE CONSTRUCTION IN INDUSTRIAL-TECHNICAL EDUCATION AND TRAINING. Class 3, cr. 3. Prerequisites: ED 285 and IED 375, or permission of instructor.

Course construction in Industrial Education and Training.

Principles of, and practice in, planning, organizing, and developing instructional content, methods, activities, and materials related to instruction in a particular subject in vocational-industrial-technical education and training situations.

IED 566. EDUCATIONAL AND INDUSTRIAL COORDINATION. Class 3, cr. 3. Senior standing or consent of instructor required.

Common problems of education and industry, with emphasis on the development and maintenance of close correlation between school programs of industrial vocational education and the manpower needs of industrial organizations.

IED 568. INSTRUCTION MATERIALS FOR TRADES AND INDUSTRIES. Cr. 1-6. Prerequisites: PSY 120, and ED 285, 304, and 460, or permission of instructor. (Not more than three hours may be accepted toward an advanced degree.)

Application of governing principles to establish an effective arrangement of teaching content required for occupational courses in vocational schools and classes.

IED 576. COOPERATIVE EDUCATION PROGRAMS. Class 3, cr. 3. Senior standing or consent of instructor required.

History and development of cooperative education, underlying principles and theories, operating practices and programs, administrative and legal aspects.

IED 590. INDIVIDUAL RESEARCH PROBLEMS. Cr. 1-6. Consent of department required.

Opportunity for students to study particular problems in any phase of industrial education or to initiate themselves into research techniques under the guidance of a member of the staff. Does not include thesis work.

INDUSTRIAL ENGINEERING TECHNOLOGY

UNDERGRADUATE LEVEL

IET 104. INDUSTRIAL ORGANIZATION. Class 3, cr. 3.

A detailed survey of organizational structures; operational, financial, marketing, and accounting activities; duties of management, planning, control, personnel, safety, wages, policy, and human factors necessary for effective management.

IET 120. SYSTEMS AND PROCEDURES. Class 3, cr. 3.

An introduction to the systems concept. Surveys recognizing and defining the system's problem; the management audit and tools for systems analysis; design and control of forms, work simplification, work measurement and procedures; operations research; punched card systems; management and administration; and organization of the systems function.

IET 198. INDUSTRIAL PRACTICE I. Cr. 1.

Practice in industry and written reports of this practice for co-op students.

IET 204. TECHNIQUES OF MAINTAINING QUALITY. Class 2, Lab. 3, cr. 3. Prerequisites: MA 111 and 112, or MA 148.

An analysis of the basic principles of quality control. Includes statistical aspects of tolerances, basic concept of probabilities, frequency distribution, X and R charts and uses of mechanical, electronic, air and light devices for checking and measuring to determine quality levels of acceptance.

IET 220. CRITICAL PATH ANALYSIS. Class 1, Lab. 3, cr. 2.

Detailed study of planning and control of a schedule by network techniques, including the time/cost analysis of CPM scheduling for application on construction projects, job shop scheduling and related problems. Includes an introduction to PERT and the use of the computer for network analysis.

IET 224. PRODUCTION PLANNING AND CONTROL. Class 2, Lab. 3, cr. 3.

Preproduction planning of the most economical methods, machines, operations, and materials for the manufacture of a product. The planning, scheduling, routing, and detailed procedure of production control.

IET 244. FUNDAMENTALS OF PRODUCTION COST. Class 1, Lab. 3, cr. 2.

Fundamental mechanics (rules for debit and credit) of accounting, principles of account classification business forms and procedures, financial and operating statements, and elements of cost accounting—all from the viewpoint of industrial organization.

IET 250. FUNDAMENTALS OF PRODUCTION COST ANALYSIS. Class 2, Lab. 2, cr. 3. Prerequisite or corequisite: IET 104.

Surveys of fundamental mechanics of accounting, principles of account classification, financial and operating statements, and the generation of cost data according to cost accounting principles. Surveys the generation of cost data according to the principles of engineering economy. Examines applications of cost accounting data and engineering economy cost data to specific management decision areas through selected case problems.

IET 262. MOTION STUDY AND WORK METHODS. Class 2, Lab. 3, cr. 3.

The study of the various techniques of motion study including process charts, operation charts, multiple activity charts, micro and memo motion study, therbligs, the movie camera, along with actual practice in their use. Includes study and application of the basic principles used to develop better methods of performing work.

IET 266. WORK MEASUREMENT AND INCENTIVES. Class 2, Lab. 3, cr. 3. Prerequisite: IET 262.

A study of the fundamentals of time study and work measurement with actual practice in their use. Includes stop watch time study, measuring work with movie camera, the establishment of allowances by both stop watch and work sampling studies, the establishment and use of predetermined time values, and the construction and use of work measurement formulae.

IET 268. PLANT LAYOUT. Class 2, Lab. 3, cr. 3. Prerequisite: EG 110, or equivalent.

Arrangement of stock, machine, layout of aisles, and use of space, and material handling for the highest efficiency of production.

IET 272. JOB EVALUATION. Class 2, cr. 2.

A survey of the basic principles and significance of job evaluation. An analysis of current practices and techniques used in job analysis, job descriptions, and job evaluation.

IET 280. WAGE INCENTIVE. Class 2, cr. 2.

An analysis and study of various types of wage incentive plans, their significance, adaptability, effectiveness, and equitability. A systematic appraisal of the basic objectives and currently used techniques in the administration of wage incentive programs.

IET 296. INDUSTRIAL TECHNOLOGY CASE PROBLEMS. Class 2, cr. 2.

Application of theories developed in the several industrial technology courses to selected general case problems — to provide practice in the integration of principles.

IET 298. INDUSTRIAL PRACTICE II. Cr. 1.

Practice in industry and written reports of this practice for co-op students.

IET 299. INDUSTRIAL ENGINEERING TECHNOLOGY. Class 0-4, Lab. 3-9, cr. 1-9. Hours and subject matter to be arranged by staff. Course may be repeated for credit up to nine hours.

IET 301. COST EVALUATION AND CONTROL. Class 3, cr. 3. Prerequisite: IET 250.

Designing, installing, and improving standard cost systems in industry, including the establishment of basic standards. Develops the mechanics of operating control reports utilizing principles of management by exception. The use of cost systems for estimating, scheduling, facilities planning, and making economic evaluations. The use of electronic data processing for establishing and analyzing production cost standards will be emphasized.

IET 312. MATERIALS HANDLING. Class 3, cr. 3. Prerequisite: IET 104.

A survey of materials handling elements, the unit load, packaging, bulk handling, the economics of materials handling, improving existing handling methods, justification for handling equipment, special handling techniques, and the management of the materials han-

dling divisions in the industrial organization.

IET 323. PRODUCTION PLANNING AND EXPEDITING. Class 2, Lab. 3, cr. 3.

Methods of planning for routing, tooling, equipment, costing and production of manufactured and processed products. Includes a detailed study of expediting procedures.

IET 324. PRODUCTION TECHNIQUES. Class 3, cr. 3. Prerequisite: IET 224.

Continuation of operation planning with emphasis upon the equipment, tools, and techniques used in mass production. Adaptation of proposed plans to conform to existing facilities.

IET 351. PRODUCTION CONTROL TECHNIQUES. Class 3, cr. 3. Prerequisites: IET 224 and 301.

The study of the various established techniques for analyzing and improving production operations. Emphasis is placed on the application of established analysis techniques such as critical-path scheduling, PERT inventory control, inventory management, forecasting, and linear programming. The use of computer programs for solving problems will be emphasized.

IET 354. ATTRIBUTE AND VARIABLE SAMPLING. Class 2, cr. 2. Prerequisite: IET 204.

Survey single, double, sequential, variable, and continuous production sampling plans. It includes the calculation and plotting of OG, AOQ, and AOQL curves and determining the economic sampling number. Also includes the use of Dodge Romig, MIL STD 105 and MIL STD 414 tables.

IET 364. TOTAL QUALITY CONTROL. Class 3, cr. 3.

The course is aimed at determining customer needs and wants, interpreting these into a design during production, follow-up on field performance, and feeding back quality information to further improve the quality system.

IET 398. INDUSTRIAL PRACTICE III. Cr. 1.

Practice in industry and written reports of this practice for co-op students.

IET 404. INDUSTRIAL ORGANIZATION. Class 3, cr. 3. (Not open to students who have had IET 104.)

A study of industrial organization structures and an introduction to managerial responsibilities including the activities of industrial administration, financing, managerial controls, product development, manufacturing engineering, material control, quality control, and manpower management areas of operations.

IET 450. PRODUCTION COST ANALYSIS. Class 2, Lab. 2, cr. 3. (Not open to students who have had IET 250.)

An introduction to financial statements and to the study of the costs of production in terms of break-even and least cost alternatives including present and future costs when related to the time value of money, budgeting, labor and overhead, production cost control and the role of the supervisor and the industrial engineering technologist to cost control.

IET 460. MOTION AND TIME STUDY. Class 2, Lab. 3, cr. 3. Prerequisite: junior standing.

Techniques of motion and time study, process charts, operation charts, multiple activity charts, micromotion study, therbligs, and stop-watch time study.

IET 497. SENIOR PROJECT. Class 2, Lab. 2, cr. 3.

Hours to be arranged. Directed work on individual projects for senior industrial engineering technology students.

IET 498. INDUSTRIAL PRACTICE IV. Cr. 1.

Practice in industry and written reports of this practice for co-op students.

MECHANICAL ENGINEERING TECHNOLOGY

UNDERGRADUATE LEVEL

MET 100. APPLIED ENGINEERING COMPUTATIONS. Lab. 3, cr. 1. Prerequisite or corequisite: MA 147.

Practical application of the proper use of the slide rule, desk calculator, and an introduction to the electronic computer and dimensional analysis. How to draw graphs and introduction to means of their reproduction.

MET 105. INTRODUCTION TO ENGINEERING TECHNOLOGY. Class 1, Lab. 6, cr. 3 or Class 2, Lab. 3, cr. 3. Prerequisite or corequisite: MA 147.

Orientation topics covering plan of study, departmental and university serv-

ices, "How to Study", Engineering Technology as a profession and an introduction to the design process.

MET 112. APPLIED MECHANISMS. Class 3, cr. 3 or Class 1, Lab. 5, cr. 3.

An analysis of motions, displacements, velocities, friction wheels, instant centers, flexible connectors, cams, linkages, and gears.

MET 156. GRAPHICAL COMPUTATIONS. Lab. 6, cr. 3. Prerequisite: EG 114; prerequisite or corequisite: MA 147.

Descriptive geometry principles applied to the solution of engineering problems, intersections and development of planes and solids; layout of objects in space; and determination of clearances between objects in space.

MET 157. ELECTRICAL AND ELECTRONIC DRAFTING. Class 0, Lab. 5, cr. 2.

A basic course in drawing for electrical engineering technology students, with emphasis on orthographic projection, sketching and print interpretation relevant to the electrical and electronics industry, utilization of electrical symbols, projection and dimensioning practice, sectioning and conventional practice in executing fabrication of electrical detail and assembly drawings, execution of schematic drawings, block diagrams, cable drawings, wire lifts, printed circuits, and vendor's parts. Problems are designed to require practical reasoning and development of good techniques.

MET 180. MATERIALS AND PROCESSES. Class 2, cr. 2.

Application and characteristics both physical and chemical, of the materials most commonly used in industry; the primary processes involved in producing these materials for industry.

MET 200. POWER SYSTEMS. Class 3, cr. 3. Prerequisite: MA 147.

A survey of steam and nuclear power plants, internal combustion engines, gas turbines, pumps, compressors, fans and blowers, refrigeration. Some theory in thermodynamics, combustion of fuels, heat transfer. Power generation and application to various fields with special mention of transportation.

MET 204. PRODUCTION DRAWING. Lab. 6, cr. 3. Prerequisites: EG 114 and MET 335.

Application of principles of engineering drawing to detail, assembly, design layout equipment installation, and related drawings.

MET 210. APPLIED STATICS. Class 2, cr. 2. Prerequisite: MA 147 or 150.

Force systems, resultants and equilibrium, centroids of areas and centers and centers of gravity of bodies, trusses, frames, beams, friction and moments of inertia of areas and bodies.

MET 211. APPLIED STRENGTH OF MATERIALS. Class 4, cr. 4 or Class 3, Lab. 2, cr. 4. Prerequisite: MET 210.

Principles of applied strength of materials primarily with reference to mechanical design.

MET 212. MECHANICS OF MATERIALS. Class 4, cr. 4 or Class 3, Lab. 2, cr. 4. Prerequisite: MA 148.

Forces acting on rigid bodies at rest and in motion: embracing vectors, force laws and moment laws of equilibrium for various force systems, centroids, center of gravity and moments of inertia, stress and strain, riveted and welded joints, torsion, shear, bending and deflection of beams, combined stresses and columns.

MET 216. MACHINE ELEMENTS. Class 4, cr. 4, or Class 3, Lab. 2, cr. 4. Prerequisites: MET 204 and 211.

A survey of the more important elements used in tools and machines, and their general characteristics pertaining to application, operational behavior, efficiency, economy, and standardization.

MET 228. MACHINE DESIGN I. Lab. 6, cr. 3. Prerequisites: MET 216 and MET 330.

Practical applications in the design of machines and products utilizing mechanical, pneumatic, hydraulic and electrical operation and control.

MET 232. DYNAMICS. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3. Prerequisites: MET 210.

Basic fundamentals of dynamics; displacement, velocities, acceleration, work energy, power, impulse, momentum, and impact.

MET 257. INTERDISCIPLINARY DRAFTING. Class 1, Lab. 6, cr. 3. Prerequisites: EG 114, MET 180.

A course designed to be of an interdisciplinary drafting nature, providing introductory training in the area of electromechanical drafting, civil, architectural and structural drafting; industrial engineering drafting; fluid power drafting; and computer drafting. To introduce stu-

dents to the various drafting disciplines on a fundamental basis, and to develop reasonable proficiency in one or more of the disciplines on a project basis.

MET 299. MECHANICAL ENGINEERING TECHNOLOGY. Cr. 1-9.

Hours and subject matter to be arranged by staff. Primarily for third or fourth semester students with special aptitudes.

MET 300. APPLIED THERMODYNAMICS. Class 3, cr. 3. Prerequisites: MA 221.

The fundamentals of thermodynamics, including applications of the first and second laws, enthalpy, entropy, and reversible and irreversible processes.

MET 330. INTRODUCTION TO FLUID POWER. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3.

Properties of hydraulic fluids, generation, transmission and utilization of hydraulic power, hydraulic and pneumatic controls and circuits.

MET 335. BASIC MACHINING. Class 1, Lab. 3, cr. 2.

A comprehensive survey of machine tools as they are used in converting work-pieces into finished products with consideration of cost, quality, quantity, and interchangeability. Actual operation analysis of many machine tool setups will be provided for comparison studies.

MET 340. PIPING AND PLUMBING DESIGN. Class 3, cr. 3. Prerequisites: MET 330 and MET 211.

Design of plumbing systems, includes losses in pipes, fittings, nozzles, orifices, etc. Includes steam, water, and oil systems. Piping handbooks and catalogs are utilized in conjunction with the State of Indiana Piping Code.

MET 350. APPLIED FLUID MECHANICS. Class 3, cr. 3. Prerequisite: MET 200.

The fundamentals of fluid mechanics, including properties of fluid, pressure; hydrostatic force on submerged areas; kinematics and dynamics of fluid flow; friction losses and sizing of pipes.

MET 360. HEATING, VENTILATING, AND AIR CONDITIONING. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3. Prerequisite: MET 200 or 400.

A study of heat losses, heat producing equipment and cooling equipment in addition to the design of the direct systems. Includes controls and cost estimating for commercial, industrial and residential systems. Codes and standards are emphasized throughout the course.

MET 361. REFRIGERATION. Class 3, cr. 3, or Class 2, Lab. 2, cr. 3. Prerequisite: MET 360.

Design and maintenance of refrigeration systems for large and small applications. This course is intended to complement MET 260 for large air conditioning systems.

MET 380. MATERIALS AND PROCESSES. Class 2, cr. 2. Open only to non-MET students.

Application and characteristics, both physical and chemical, of the materials most commonly used in industry; the primary processes involved in producing these materials for industry.

MET 384. INSTRUMENTATION. Class 2, Lab. 3, cr. 3. Prerequisite: MA 148 or permission of instructor.

Basic principles of instruments selected. Care and use as found in industry for physical measurement.

MET 400. POWER SYSTEMS. Class 3, cr. 3. Prerequisite: Open only to non-MET students having had MA 148.

A survey of steam and nuclear power plants, internal combustion engines, gas turbines, pumps, compressors, fans and blowers, refrigeration. Some theory in thermodynamics, combustion of fuels, heat transfer. Power generation and application to various fields with special mention of transportation.

MET 412. MECHANICS OF MATERIALS. Class 4, cr. 4. Prerequisite: MA 148. Open only to non-MET students.

Forces acting on rigid bodies at rest and in motion-embracing vectors, force and moment laws of equilibrium for various force systems, centroids, center of gravity and moments of inertia, stress and strain, riveted and welded joints, torsion, shear, bending and deflection of beams, combined stresses and columns.

MET 426. INTERNAL COMBUSTION ENGINES. Class 2, Lab. 2, cr. 3. Prerequisite: MET 200.

A study of the spark ignition, compression ignition and continuous burning internal combustion engines.

MET 485. CONTROL SYSTEMS COMPONENTS. Class 2, Lab. 3, cr. 3. Prerequisite: MET 384 or permission of the instructor.

Principles and practices for selecting and applying computing and controlling com-

ponents in process control systems. Emphasis on the operating characteristics of pneumatic equipment with studies of process time lag, dead time, and reaction rate together with effect of these upon on-off, proportioned band, reset and rate control modes.

MET 486. CONTROL SYSTEMS ANALYSIS. Class 3, Lab. 0, cr. 3. Prerequisite: MET 485 or permission of the instructor.

Studies of industrial control systems using both the Ziegler-Nichols ultimate sensitivity method of system adjustment and reaction rate method of adjustment. Study of analysis measurements and sampling systems. By use of industrial literature, the student is to develop a bill of materials for a control system.

MET 495. SENIOR PROJECT SURVEY. Class 1, cr. 1.

Students will select several design projects and give written or oral reports on their proposed solutions. They will be encouraged to select and finalize one project proposal in preparation for MET 497.

MET 497. SENIOR PROJECT. Class 2, Lab. 2, cr. 3.

Directed work on individual projects for senior mechanical engineering technology students.

SUPERVISION

UNDERGRADUATE LEVEL

SPV 100. SUPERVISION LECTURES. Class 1, cr. 1.

Introduction and orientation to the Department of Supervision and an overview of the supervision and personnel functions in the world of work.

SPV 252. HUMAN RELATIONS IN SUPERVISION. Class 3, cr. 3.

Study of the basis and organization of individual and group behavior. Special emphasis on typical supervisory relationships.

SPV 262. SUPERVISED WORK EXPERIENCE. Cr. 1-3. May be repeated to a maximum of nine. Consent of department required.

Supervised work experience directed toward providing orientation, background, and insight into work situations and operations.

SPV 331. OCCUPATIONAL SAFETY AND HEALTH. Class 3, cr. 3. Prerequisite: consent of instructor.

A presentation of those aspects of occupational safety and health which are most essential to the first-line supervisor. Emphasis is placed on developing an understanding of the economic, legal and social factors related to providing a safe and healthful working environment.

SPV 362. COOPERATIVE OCCUPATIONAL INTERNSHIP. Cr. 3-6. May be repeated to a maximum of 24. Consent of department required.

Organized and supervised work experience directed toward preparation for supervisory, personnel and related positions. Planned and supervised by the departmental staff in cooperation with employing organizations.

SPV 374. ELEMENTS OF SUPERVISION. Class 3, cr. 3.

Introduction to and overview of the fundamental concepts of supervision. Emphasis is placed on the supervisor's major functions and essential areas of knowledge, his relations with others and his personal development.

SPV 375. BASIC METHODS OF TRAINING FOR SUPERVISORS. Class 3, cr. 3. Prerequisite: SPV 374 or consent of instructor.

Principles, practices, and variations of basic methods of instruction as related to training situations found in the world of work. Emphasis on the supervisor as a trainer.

SPV 376. SUPERVISION AND PERSONNEL PROBLEMS. Class 3, cr. 3. Prerequisite: SPV 374 or consent of instructor.

Analysis and discussion of selected case problems concerning typical personnel situations faced by the supervisor. Emphasis directed toward development of student attitude, philosophy, analytical ability and problem solving skills within the working environment.

SPV 474. CONFERENCE LEADERSHIP TRAINING. Class 4, Lab. 2, cr. 4.

Understanding the role of the conference in the world of work, with practical applications of the various techniques of conference leadership, and an understanding of group dynamics in the conference situation.

DUAL LEVEL
Undergraduate-Graduate

SPV 567. SUPERVISED FIELD PRACTICE IN INDUSTRIAL TRAINING. Cr. 3.

SPV 574. MANAGERIAL TRAINING AND DEVELOPMENT. Class 3, cr. 3. Prerequisite: SPV 374 and SPV 375. Open to seniors and graduate students only.

Review of current managerial education and development theories and practices; discussion of fundamental social, economic and political changes affecting business and the work of managing; implications of these changes for individual manager development and continued growth.

SPV 577. ORGANIZATION AND ADMINISTRATION OF TRAINING AND DEVELOPMENT. Class 3, cr. 3. Prerequisite: SPV 375. Prerequisite or corequisite: SPV 574. Open to seniors and graduate students only.

The function and management of training and development in the world of work.

SPV 590. INDIVIDUAL RESEARCH PROBLEMS IN SUPERVISION AND PERSONNEL. Cr. 1-6. Consent of department required.

Opportunity to study specific problems in the field of supervision and personnel under the guidance of a qualified faculty member within the department. Does not include thesis work.

DEPARTMENT OF MATHEMATICAL SCIENCES

Theodore S. Chihara, Head

FACULTY: W. J. Barlow, R. D. Bechtel, T. S. Chihara, D. L. Clark, J. E. Forbes (on leave), R. J. Hill, H. Hosek, B. L. Jahr, W. C. Lordan, J. P. McLaughlin, C. M. Murphy, N. Relich, J. A. Smith, W. A. Stock (Emeritus), D. J. Troy, H. B. VonHorn, R. J. Wagenblast, E. C. Zacher

The Department of Mathematical Sciences offers courses in Mathematics, Statistics, and Computer Science. The department offers programs leading to the B.S. degree with a major in mathematics. In addition to a regular major, a student may select options in Teaching, Statistics, or Computer Science.

ADMISSION REQUIREMENTS

Minimal requirements for admission to the programs in Mathematical Sciences are 15 units of high school credit which must include: 2 units in algebra, one unit in geometry, one unit in a laboratory science, 3 units in English and one unit in Social Studies.

Students majoring in mathematics are expected to begin their study of mathematics with MA 163 which assumes a background of four years of college preparatory mathematics including a semester of trigonometry. Students who enter with less preparation than this should expect to take a preparatory course, MA 151, which does not carry credit toward graduation.

PASS/NOT PASS OPTION

Mathematics majors may elect to take some courses toward their degree under the "pass/not pass" option subject to the following restrictions:

1. The option is open only to students who are classified as sophomores or upper division students with an index of 4.5 or above.

2. A student is to take no more than two courses per year and not more than 20 percent of the total credit hours required for his graduation. Summer session courses shall apply to the year preceding the summer session.
3. So far as courses presented to satisfy degree requirements are concerned, only free electives and courses in the 18-hour block* in humanities and behavioral and social sciences may be taken under the pass/not pass option. Such courses may be used to satisfy the 18-hour block only if those chosen are more advanced than those usually elected at the student's level.
4. The pass/not pass option may not be elected for any course which already appears on the student's academic record (e.g., a student who withdrew from a course after the end of the drop/add period receives and has made a part of his academic record the grade W in this course. He cannot subsequently enroll in this course on the pass/not pass option.)
5. The registrar's class rosters will indicate which students have elected this option.
6. A student who is enrolled in a course under this option has the same obligations as those who are enrolled in the course for credit with letter grade. When the instructor reports final grades in the course, he will report that any such student who would have earned a grade of A, B, or C has passed the course, and that any other such student has not passed. The registrar will make an appropriate notation on the student's academic record in place of a letter grade but will not use the course in computing grade indices.

GENERAL DEGREE REQUIREMENTS

The general requirements for a B.S. degree in the Mathematical Sciences are:

1. A total of 124 semester hours of credit. Mathematics courses numbered below MA 163 cannot be included in this total.
2. English Composition. ENGL 103 with a grade of C or better or ENGL 104 and 105 is required. Students who complete ENGL 104 with a grade of A may substitute any literature or writing course for ENGL 105.
3. Modern Foreign Language. A student must pass a fourth-semester college level course in a modern foreign language or an equivalent proficiency examination. Exception: students with a Teacher Option who have

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* Humanities, social studies, and behavioral sciences: In specifying this requirement, the school identifies the following three areas:

1. literature, philosophy, creative arts
2. history, political science
3. economics, sociology, psychology.

The minimum requirement is 18 hours chosen from the above three areas as follows:

a. Choose a two-course sequence from 1, 2, or 3 above.
b. Choose any two courses (not necessarily a sequence) from an area not chosen in a.
c. Choose any other two courses from any of the areas 1, 2 or 3.

successfully completed the professional semester in a high school teaching curriculum can substitute "second-semester" for "fourth-semester" in this requirement.

4. Humanities, social studies, and behavioral sciences. In specifying this requirement, the school identifies the following three areas:
   a. literature, philosophy, creative arts;
   b. history, political science;
   c. economics, sociology, psychology.

   The minimum requirement is 18 hours chosen from the above three areas. Six hours must be chosen from each of two of them. A coherent two-course sequence must be included. It is strongly recommended that the student take more than a minimal program. The student should consult his adviser as to the most efficient individual manner of completing this flexible requirement.

   In the area of creative arts, only those courses specified as meeting the aesthetics requirement of the School of Humanities, Education, and Social Sciences, may be used in meeting this requirement in humanities, social studies, and behavioral sciences. Other courses in that area may be used as free electives.

5. Science. Each student must take at least four courses in laboratory science outside his major area. It is preferable that he take two-course sequences in each of two sciences. The courses selected should normally be chosen from the offerings of the departments of biology, chemistry, geosciences, and physics. However, students may, with the approval of the department of their major, use no more than two computer sciences or engineering courses to partially fulfill the laboratory science requirement.

6. Minor Requirements. In order to comply with these requirements, the student must acquire 18 credit hours in one of (1) the natural sceinces, (2) the social sciences, or (3) the humanities, including at least three courses beyond the introductory level. Normally, all of the courses for the minor are taken within a single department, but courses in several departments within a single one of three areas will be acceptable if approved by the student's adviser. Courses may be used for the double purpose of fulfilling general education requirements and the minor requirement of the Department of Mathematical Sciences.

The guiding principle is that the student must acquire some depth of study in a subject other than mathematics. Physics is a good choice of minor for students in this division.

7. Major Requirements. The following are required:
   a. The basic calculus sequence, MA 163, 164, 261;
   b. MA 262 and MA 453;
   c. Two courses selected from the following: MA 301 (Teacher Option only), 361, 362, 441, 540, CS 414;
   d. Nine additional hours in mathematics, statistics or computer science courses number above 300. However, STAT 301, 302, CS 380 may not be counted in the nine hours. Also, at most one statistical methods course may be included in the nine hours;

e. A graduation index of at least 4.0 in those courses in the department which are used to fulfill the minimum requireemnts listed under a, b, c, and d above.

A typical program for the first two years is:

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	Modern language	(3)	Modern language
(3-4)	General education elective	(3-4)	General education elective
(14-15)		(14-15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(3)	Modern language	(3)	Modern language
(9)	General education and minor electives	(9)	General education and minor electives
(16)		(16)	

The remaining two years will be devoted to completing the major and minor requirements and will vary according to the options selected.

SPECIAL CREDIT OPPORTUNITIES

The department has a regular program of offering advanced placement with credit in lower division courses. Incoming students should consult with their advisors or with the Mathematical Sciences department to determine whether they may qualify for such placement with credit. In addition, students who wish to earn credit without advanced placement should petition the Mathematical Sciences department head for credit by examination.

MATHEMATICS

SPECIAL SERVICE COURSES

MA 1. HIGH SCHOOL ALGEBRA. Class 3, cr. 0. Credit: one unit for admission.

MA 2. PLANE GEOMETRY. Class 3, cr. 0. Credit: one unit for admission.

UNDERGRADUATE LEVEL

MA 111. ALGEBRA. Class 3, cr. 3.

MA 112. TRIGONOMETRY. Class 3, cr. 3. Should be preceded by MA 111.

MA 121. ELEMENTARY MATHEMATICS. Class 3, cr. 3. Not open to students with credit in MA 123, 130, or 133.

A survey of mathematics with topics chosen from number theory, topology, set theory, geometry, algebra, and analysis.

MA 122. ELEMENTARY LOGIC AND SET THEORY. Class 3, cr. 3.

Set operations, power sets, one-to-one correspondence, and cardinal numbers; sentential calculus, restricted predicate calculus, negation, and logically valid arguments.

MA 130. MATHEMATICS FOR ELEMENTARY TEACHERS I. Class 3, cr. 3. Open only to students majoring in elementary education.

The sequence MA 130-131-132 fulfills the mathematics requirements for elementary education majors.

Numeration systems; natural numbers, whole numbers, numbers of arithmetic, properties, algorithms, a structural approach; mathematical reasoning, sets, sentences, logic proof.

MA 131. MATHEMATICS FOR ELEMENTARY TEACHERS II. Class 3, cr. 3. Prerequisite: MA 130. Open only to students majoring in elementary education.

Metric and nonmetric properties of geometric figures; measurement; coordinate geometry; vector geometry.

MA 132. MATHEMATICS FOR ELEMENTARY TEACHERS III. Class 3, cr. 3. Prerequisite: MA 131. Open only to students majoring in elementary education.

Integers, rationals, reals, a structural approach with proofs; algorithms, decimal and fractional notation; probability.

MA 147. ALGEBRA AND TRIGONOMETRY FOR TECHNOLOGY I. Class 3, cr. 3. Not open to students with credit in MA 151, 153 or 154.

MA 148. ALGEBRA AND TRIGONOMETRY FOR TECHNOLOGY II. Class 3, cr. 3. Not open to students with credit in MA 151 or 154.

Continuation of MA 147.

MA 151. ALGEBRA AND TRIGONOMETRY. Class 5, cr. 5.

College algebra and trigonometry for students with inadequate preparation for MA 163. Does not carry credit toward graduation in the Schools of Engineering or the Division of Mathematical Sciences.

MA 153. ALGEBRA AND TRIGONOMETRY I. Class 3, cr. 3. Not open to students with credit in MA 147, 148, or 151.

MA 153 together with 154 meets the mathematics requirement for the School of Humanities, Social Science, and Education. Does not carry credit toward graduation in the Schools of Engineering and the Division of Mathematical Sciences.

MA 154. ALGEBRA AND TRIGONOMETRY II. Class 3, cr. 3. Not open to students with credit in MA 148 or 151.

Continuation of MA 153. Does not carry credit toward graduation in the Schools of Engineering and the Division of Mathematical Sciences.

MA 163. INTEGRATED CALCULUS AND ANALYTIC GEOMETRY I. Class 5, cr. 5. Not open to students with credit in MA 161.

Topics from plane analytic geometry. Introduction to differentiation and integration. Applications.

MA 164. INTEGRATED CALCULUS AND ANALYTIC GEOMETRY II. Class 5, cr. 5.

Continuation of MA 163. Completion of introductory study of topics in plane analytic geometry and the calculus of one variable.

MA 213. FINITE MATHEMATICS I. Class 3, cr. 3. Prerequisite: MA 151 or equivalent.

Elementary logic, basic set theory, finite mathematical models, elementary probability theory. Applications to problems in the biological and social sciences.

MA 214. FINITE MATHEMATICS II. Class 3, cr. 3. Prerequisite: MA 213.

Linear algebra: simultaneous linear equations, determinants, matrices and vectors; linear programming; game theory; Markov chains. Applications to problems in the biological and social sciences.

MA 221. CALCULUS FOR TECHNOLOGY I. Class 3, cr. 3. Prerequisite: MA 148 or equivalent.

A two-semester sequence in the techniques of calculus for students enrolled in certain technical curricula. Not open to students with credit in MA 223 and 224.

MA 222. CALCULUS FOR TECHNOLOGY II. Class 3, cr. 3. Prerequisite: MA 221. Not open to students with credit in MA 224.

Continuation of MA 221.

MA 223. INTRODUCTORY ANALYSIS I. Class 3, cr. 3. Prerequisite: MA 151 or equivalent. Should be preceded

by MA 214. Not open to students with credit in MA 163.

Differential and integral calculus of one variable. Applications to problems in the biological and social sciences.

MA 224. INTRODUCTORY ANALYSIS II. Class 3, cr. 3. Prerequisite: MA 223. Not open to students with credit in MA 164 or 222.

Partial derivatives; differentials; multiple integrals; introduction to differential equations. Applications to problems in the biological and social sciences.

MA 261. MULTIVARIATE CALCULUS. Class 4, cr. 4. Prerequisite: MA 164.

Solid analytic geometry, partial differentiation, multiple integrals, infinite series.

MA 262. LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS. Class 4, cr. 4. Prerequisite: MA 261.

Linear algebra, elements of differential equations.

MA 301. TOPICS IN ELEMENTARY ANALYSIS. Class 3, cr. 3. Prerequisite: MA 261.

A critical study of classical problems, involving limit concepts, which arise naturally in the schools. These problems are first attacked directly with reference to the historical development, then standard calculus techniques are applied. Primarily for prospective secondary school teachers.

MA 351. ELEMENTARY LINEAR ALGEBRA. Class 3, cr. 3. Prerequisite: MA 261.

Systems of linear equations, finite dimensional vector spaces, matrices, determinants, applications to analytic geometry.

MA 361. ADVANCED CALCULUS AND DIFFERENTIAL EQUATIONS. Class 3, cr. 3.

Elementary ordinary differential equations with emphasis on linear equations. Infinite series of functions, uniform convergence.

MA 362. TOPICS IN ADVANCED CALCULUS. Class 3, cr. 3. Prerequisite: MA 361.

Multivariate calculus; partial differentiation, implicit function theorems, line and surface integrals, vector fields, theorems of Gauss, Green, and Stokes.

MA 422. DIFFERENTIAL EQUATIONS FOR ENGINEERING AND THE PHYSICAL SCIENCES. Class 3, cr. 3. Prerequisite: MA 262.

Derivation and solutions of additional types of differential equations for problems in science and engineering.

MA 441. FOUNDATIONS OF ANALYSIS. Class 3, cr. 3. Prerequisite: MA 261 or equivalent.

Real number system, functions, sequences, limits, continuity, theory of differentiation and integration.

MA 453. ALGEBRA I. Class 3, cr. 3. Prerequisite: MA 262 or consent of instructor.

MA 454. ALGEBRA II. Class 3, cr. 3. Prerequisite: MA 453. MA 453 and 454 are primarily for mathematics majors.

The topics discussed are: fundamental properties of groups, rings, integral domains, fields; homomorphisms; Abelian groups and modules; polynomials, solution to algebraic equations, field extensions; vector spaces, linear transformations and their decomposition; inner product spaces, characteristic values.

MA 490. TOPICS IN MATHEMATICS FOR UNDERGRADUATES. Cr. 1-5.

Supervised reading and reports in various fields. Open only to students with the consent of the department.

DUAL LEVEL
Undergraduate-Graduate

MA 501. TECHNIQUES OF APPLIED MATHEMATICS I. Class 3, cr. 3. Prerequisite: MA 262 or equivalent.

This is strictly a methods course. MA 501, 502 are inadequate substitutes for MA 510 and/or 511 where the latter are used as prerequisites. MA 501, 502 are not acceptable for graduate credit in some engineering programs.

Matrices, determinants, complex functions; Fourier series, harmonic analysis; numerical methods.

MA 502. TECHNIQUES OF APPLIED MATHEMATICS II. Class 3, cr. 3. Prerequisite: MA 501.

Continuation of MA 501. Gamma, Beta, and Bessel functions, elliptic integrals; vector algebra and calculus; solution of Laplace wave, and heat equations by Fourier and Fourier-Bessel series; Laplace transform.

MA 510. ADVANCED CALCULUS. Class 3, cr. 3. Prerequisite: MA 262 or equivalent.

Functions of several variables; partial derivative, differential; quadratic approxi-

mation, extrema; vector calculus, gradient; line, surface, and volume integrals: divergence, curl, Laplacian, integral, theorems; mappings, continuity, differentiability, inverse mapping; implicit functions; orthogonal coordinates; weight function, Stielties integral, delta-measure.

MA 520. BOUNDARY VALUE PROBLEMS OF DIFFERENTIAL EQUATIONS. Class 3, cr. 3. Prerequisites: MA 422, 510, or MA 361, 362.

Sturm-Liouville theory; singular boundary conditions, orthogonal expansions, separation of variables in partial differential equations; spherical harmonics.

MA 525. INTRODUCTION TO COMPLEX ANALYSIS. Class 3, cr. 3. Prerequisite: MA 510.

Complex numbers and complex-valued functions; differentiation of complex functions; power series, uniform convergence; integration, contour integrals; elementary conformal mapping.

MA 532. ELEMENTS OF STOCHASTIC PROCESSES. Class 3, cr. 3. Prerequisites: MA 519, 525.

A basic course in stochastic processes including normal processes, covariance processes. Poisson processes, renewal processes, and Markov processes.

MA 540. ANALYSIS I. Class 3, cr. 3. Prerequisite: MA 361.

Infinite series and products, sequences of functions, functions of a complex variable.

MA 541. ANALYSIS II. Class 3, cr. 3. Prerequisite: MA 540.

Fourier series and integrals, existence and properties of solutions of differential equations, special functions.

MA 547. ANALYSIS FOR TEACHERS I. Class 3, cr. 3. Prerequisite: MA 261.

Inequalities, sequences, functions, limits. Application to such basic concepts as length and area and their implications for the teacher of mathematics.

MA 548. ANALYSIS FOR TEACHERS II. Class 3, cr. 3. Prerequisite: MA 547.

Elementary functions and basic theorems of calculus.

MA 550. ALGEBRA FOR TEACHERS I. Class 3, cr. 3. Prerequisite: MA 351 or graduate standing. May not be used for a major in mathematics.

Definitions and elementary properties of groups, rings, integral domains, fields, vector spaces, and matrices, with major emphasis on the rings of integers, rational numbers, complex numbers and polynomials. Intended primarily for secondary school teachers.

MA 551. ALGEBRA FOR TEACHERS II. Class 3, cr. 3. Prerequisite: MA 550.

A continuation of MA 550.

MA 553. INTRODUCTION TO ABSTRACT ALGEBRA. Class 3, cr. 3. Prerequisite: MA 453.

Basic properties of groups, rings, integral domains, fields, polynomials. Solvable groups. Finitely generated abelian groups. Algebraic and transcendental field extensions. Separable extensions. Normal extensions, Galois theory.

MA 554. LINEAR ALGEBRA. Class 3, cr. 3. Prerequisite: MA 453.

Vector spaces, linear transformations, matrices. Solution of systems of linear equations. Alternating forms; determinants. Inner product spaces; orthogonal reduction of symmetric matrices. Direct sum decompositions, characteristic values, diagonable and nilpotent transformations, Jordan normal form.

MA 556. INTRODUCTION TO THE THEORY OF NUMBERS. Class 3, cr. 3. Prerequisite: MA 261.

Divisibility, congruences, quadratic residues, Diophantine equations, the sequence of primes.

MA 560. FUNDAMENTAL CONCEPTS OF GEOMETRY. Class 3, cr. 3. Prerequisite: MA 261.

Foundations of Euclidean geometry, including a critique of Euclid's "Elements" and a detailed study of an axiom system such as that of Hilbert. Independence of the parallel axiom and introduction to non-Euclidean geometry.

MA 561. PROJECTIVE GEOMETRY. Class 3, cr. 3. Prerequisite: MA 261.

Ideal elements, duality, harmonic sets, projective metric, theory of conics, involution, imaginary elements.

MA 563. ADVANCED GEOMETRY. Class 3, cr. 3. May not be used for a major in mathematics.

A critique of Euclid's elements and a detailed study of Hilbert's postulates with an introduction to non-Euclidean geometry. Primarily for prospective secondary school teachers.

MA 571. ELEMENTARY TOPOLOGY. Class 3, cr. 3. Prerequisite: MA 442.

General topological spaces and continuity. Connectedness. Separation. Compactness. Metric spaces. Function spaces. Homotopy; the fundamental group.

MA 581. INTRODUCTION TO LOGIC FOR TEACHERS. Class 3, cr. 3. Prerequisites: MA 351 and 441 or 511.

Sentential and general theory of inference and nature of proof: elementary axiom systems.

MA 583. HISTORY OF ELEMENTARY MATHEMATICS. Class 3, cr. 3. Prerequisites: MA 550 and 563.

A survey of the major developments of mathematics through the eighteenth century, with selected topics from more recent mathematics, including non-Euclidean geometry and the axiomatic method.

MA 587. GENERAL SET THEORY. Class 3, cr. 3. Prerequisite: MA 411 or 453 or consent of instructor.

Set algebra. Functions and relations. Ordering relations. Transfinite induction. Cardinal and ordinal numbers. The axiom of choice. Maximal principles. The continuum hypothesis. Applications to algebra, analysis, and topology.

MA 598. TOPICS IN MATHEMATICS. Cr. 1-5.

Directed study and reports for students who wish to undertake individual reading and study on approved topics.

STATISTICS

UNDERGRADUATE LEVEL

STAT 301. ELEMENTARY STATISTICAL METHODS I. Class 3, cr. 3. Prerequisite: college algebra. Not open to students in the Division of Mathematical Sciences and Schools of Engineering.

A basic introductory statistics course with applications shown to various fields and emphasis placed on assumptions, applicability, and interpretations, of various statistical techniques. Subject matter includes frequency distributions, descriptive statistics, elementary probability, normal analysis of variance, with emphasis on distribution applications, sampling distribution, estimation, hypothesis testing and linear regression.

STAT 302. ELEMENTARY STATISTICAL METHODS II. Class 3, cr. 3. Prerequisite: STAT 301 or equivalent.

Continuation of STAT 301. Subject matter includes multiple regression and analysis of variance, with emphasis on statistical inference and applications to various fields.

DUAL LEVEL
Undergraduate-Graduate

STAT 511. STATISTICAL METHODS I. Class 3, cr. 3. Prerequisite: MA 262 or consent of instructor.

Descriptive statistics; elementary probability; sampling distributions; inference, testing hypotheses, and estimation; Normal, binomial, Poisson, hypergeometric distributions; one way analysis of variance; contingency tables.

STAT 512. STATISTICAL METHODS II. Class 3, cr. 3. Prerequisite: STAT 511.

Linear and multiple regression; nonlinear regression; analysis of variance; random, fixed, mixed models, nested factorial, expected mean squares, pooling, modifications under relaxed assumptions, multiple comparisons, variance of estimates; analysis of covariance.

STAT 513. APPLICATIONS OF STATISTICS IN INDUSTRY. Class 3, cr. 3. Prerequisite: STAT 511.

A strong background in control charts and acceptance sampling; continuous sampling plans, sequential analysis, statistics of combinations, and some nonparametric methods.

STAT 516. BASIC PROBABILITY AND APPLICATIONS. Class 3, cr. 3. Prerequisite: MA 164 or 224 or equivalent. MA 261 desirable.

A first course in probability intended to serve as a foundation for statistics and other applications.

Intuitive background; sample spaces and random variables; joint, conditional, and marginal distributions; special distributions of statistical importance; moments and moment generating functions; statement and application of limit theorems; introduction to Markov chains.

STAT 517. STATISTICAL INFERENCE. Class 3, cr. 3. Prerequisites: STAT 516 or equivalent.

A basic course in applied statistics emphasizing understanding and application of standard statistical methods.

Estimation including unbiased, maximum likelihood, and moment estimation; testing hypotheses for standard distributions and contingency tables; confidence intervals and regions; introduction to nonparametric inference and tests of goodness to fit; introduction to multivariate analysis.

COMPUTER SCIENCES

UNDERGRADUATE LEVEL

CS 210. INTRODUCTION TO DATA PROCESSING. Class 3, cr. 3. Corequisite: MA 151. Not open to students with credit in CS 220.

Programming of digital computers using problem-oriented languages (COBOL and FORTRAN). Problems will be selected from the areas of data processing and nonnumerical applications. The course is intended to prepare the student to use computers in later courses in the nonphysical sciences.

CS 220. INTRODUCTION TO ALGORITHMIC PROCESSES. Class 3, cr. 3. Corequisite: one semester of mathematics beyond MA 151. Not open to students with credit in CS 210.

Introduction to the intuitive notion of an algorithm; representation of algorithms in narrative form as flow charts and as computer programs; general structure of computers; computer experience using a procedure-oriented language in programming algorithms such as those used in elementary numerical calculations, sorting, simulation of a random process and symbol manipulation; definition and use of functions, subroutines and iterative procedures; survey of a variety of significant uses of computers.

CS 300. ELEMENTS OF COMPUTERS AND PROGRAMMING. Class 3, cr. 3. Prerequisite: CS 210 or 220.

Components of digital computer. Number and character representation codes. Error detection and correction coding schemes. Machine dependent FORTRAN coding. Absolute and assembly language programming, pseudo operations, macros and buffering. Communication between operating system and user program.

Stored program digital computers; programming in problem-oriented and machine-oriented languages; pseudo-operations, system macroinstructions, programmer defined macroinstructions; solution of nonnumerical problems.

CS 380. INTRODUCTION TO DATA MANAGEMENT. Class 3, cr. 3. Prerequisite: CS 210 or 220 or the equivalent. May not be used to satisfy the major requirements in mathematics.

Introduction to basic concepts of file organization and retrieval of data from magnetic tape and disc storage media; internal and external sorting techniques for tape and disc resident data files; introduction to the COBOL programming language; illustrative problems from business data processing.

CS 414. INTRODUCTION TO NUMERICAL ANALYSIS. Class 3, cr. 3. Prerequisite: MA 261, CS 220 or equivalent knowledge of programming.

Iterative methods for solving nonlinear equations; direct and iterative methods for solving linear systems; approximations of functions, derivatives and integrals; error analysis.

DUAL LEVEL
Undergraduate-Graduate

CS 514. NUMERICAL ANALYSIS. Class 3, cr. 3. Prerequisite: CS 414 or equivalent.

Iterative methods for solving nonlinear equations; linear difference equations, applications to solution of polynomial equations; differentiation and integration formulas; numerical solution of ordinary differential equations; roundoff error bounds.

CS 515. NUMERICAL ANALYSIS OF LINEAR SYSTEMS. Class 3, cr. 3. Prerequisites: MA 351 or 511, and 441; corequisite: CS 220 or equivalent knowledge of programming.

Computational aspects of linear algebra; linear equations and matrices; direct and iterative methods; eigenvalues and eigenvectors of matrices; error analysis.

CS 590. TOPICS IN COMPUTER SCIENCES. Class 1-5, cr. 1-5.

Directed study for students who wish to undertake individual reading and study on approved topics.

MECHANICAL ENGINEERING TECHNOLOGY—See Department of Manufacturing Technology

DEPARTMENT OF NURSING

Joyce A. Ellis, Head

FACULTY: L. G. Buechley, P. S. Burosh, J. A. Ellis, M. G. Engle, R. M. Givens, J. H. Godels, L. Halfman, D. F. Johnson, M. A. Klen, L. M. Lang, C. A. Magliola, E. J. Norris, L. Orlich, M. E. Prugh, E. F. Ramsay (Emeritus), A. M. Rosenow, D. L. Sabolsice, C. E. Scherba, D. J. Slamkowski, G. J. Smokvina, J. K. Stryczek, M. A. Thomas, B. A. Watts

The Department of Nursing offers a program of studies leading to the degree Bachelor of Science with a major in nursing and an associate degree nursing program leading to examination eligibility for licensure as a registered nurse. A certificate program to prepare practical nurses for examination eligibility to become Licensed Practical Nurses is also available.

B.S. DEGREE IN NURSING

The baccalaureate degree program is designed to prepare registered nurses for leadership positions in nursing through an upper division undergraduate curriculum leading to the Bachelor of Science degree. It is planned to articulate with the associate degree nursing program. Clinical nursing experiences are obtained in many health agencies located throughout Northwest Indiana.

This program has as its purpose the development of a nurse practitioner. This practitioner has advanced skills for assessing the physical and psychosocial health-illness status of individuals, families or groups in a variety of settings; competencies include utilization of a broad range of cues for prescribing and giving care, and for articulating nursing therapies with other planned therapies.

The program aims to provide an adequate foundation for graduate study in nursing. Through its activities of education, service, and research, it strives to promote the health care of the community.

ADMISSION REQUIREMENTS:

1. Successful completion of an associate degree or diploma program in nursing.
2. Achievement of status of registered nurse licensure. Graduate nurses who have not taken the licensing examination are admitted on the condition that they must achieve Registered Nurse status by the end of their first semester.
3. Achievement of a C average or 4.0 graduation index on a point scale of 6 in all previous academic work. (Non-residents 4.5)
4. Comprehensive health examinations, chest X-ray, and tuberculin test clearance prior to starting affiliations in clinical agencies.

5. Malpractice insurance is required of all B.S. nursing students. The recommended coverage is $200,000 to $600,000.
6. Lower Division Requirements for 69 semester credit hours distributed as follows:

Science	(18)	Anatomy and Physiology, Chemistry, Biochemistry, Microbiology, Pharmacology, Math or other science core.
Communications	(9)	Speech Communication, English Composition I, English Composition II or Literature.
Nursing	(30)	Transfer credit or credit by examination.
Social Sciences	(9)	Introduction to Psychology, Introduction to Sociology or Child Psychology, Nutrition, or other advanced social science.
Elective	(3)	History, Politics, Philosophy, Arts or other course.

NUR 290 (Guided Study in Nursing: 1-6 credits) may be used to provide core requirements needed in nursing, if deficient.

Classes enter only in September of each year. However, the program can be modified to accommodate the part-time student.

Students desiring to enter at the freshman or sophomore level should request admission to the Associate Degree program in order to fulfill lower division requirements.

PLAN OF STUDY

JUNIOR YEAR

First Semester		Second Semester	
(3)	BIOL 301 (Human Design: Anatomy and Physiology)	(3)	BIOL 302 (Human Design: Anatomy and Physiology)
(3)	Advanced Social Science Elective	(3)	Advanced Social Science Elective
(10)	NUR 300* (Nursing Concepts I)	(10)	NUR 301* (Nursing Concepts II)
	(1) Module A (Theoretical Constructs in Nursing)		(6) Module A (Community Nursing I)
	(4) Module B (Assessment)		(2) Module B-1 (High Risk Mother and Infant) or Module B-2 (Drug Abuse)
	(3) Module C (Health Science and Health Care Delivery)		(2) Module C (Mental Health Nursing with Groups and Families)
	(2) Module D (Client Teaching, Family Planning, and Family Counselling)		
(16)		(16)	

* Modules described within the four upper division nursing courses are variable title and variable credit modules which may be adjusted in a flexible manner without advance notice.

SENIOR YEAR

First Semester		Second Semester	
(3)	EET 415 (Medical Electronics)	(3)	CPT 300 (Introduction to Computers)
(3)	COM 320** (Group Discussion and Conference Leadership)	(3)	Elective
(10)	NUR 400* (Nursing Concepts III)	(10)	NUR 401* (Nursing Concepts IV)
	(4) Module A (Community Nursing II)		(8) Module A (Nursing Leadership)
	(4) Module B (Acute Care Nursing)		(2) Module B (Professional Issues and Methods of Research)
	(2) Module C (Management of Long Term Illness)		
(16)		(16)	

A total of 133 semester hours is required for the baccalaureate degree in nursing. A minimum of 60 semester hours must be at the 300 course level or higher.

A.A.S. DEGREE IN NURSING

This program of nursing education provides a means of correlating the philosophy and standards of nursing education with those of general education. The over-all standards and policies of the University apply to the program in nursing as they do to the other educational programs within the University. The associate degree program is designed to fulfill the educational needs of qualified high school graduates who want to (1) prepare for nursing in a relatively short time and (2) study in a multipurpose collegiate institution where they share the responsibilities, privileges, intellectual and social experiences with all other students. Clinical nursing experiences are obtained in four cooperating area hospitals: St. Catherine, East Chicago; St. Margaret, Hammond; St. Mary Mercy, Gary; and Our Lady of Mercy, Dyer. The University nursing faculty selects, supervises, and evaluates all learning experiences.

Graduates are prepared to give care to patients as beginning general duty nurses, drawing upon their scientific knowledge and understanding of human behavior and needs. They are prepared to develop satisfactory relationships with people, to cooperate and share responsibility for their patients' welfare with other members of the nursing and health staff, and to be self-directed in learning.

Graduates of the associate degree program in nursing are eligible for state examinations for licensure as registered nurses. This program has been accredited by the National League for Nursing.

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* Modules described within the four upper division nursing courses are variable title and variable credit modules which may be adjusted in a flexible manner without advance notice.

** Other communication courses may be substituted.

ADMISSION REQUIREMENTS

1. Graduation from an accredited high school.
2. Satisfactory completion of 15 units of secondary work distributed as follows:

English	3 units
Social sciences	1 unit
Algebra and geometry	2 units
Laboratory science (Chemistry recommended)	1 unit
Additional English, language, mathematics, sciences or social studies	3 units
Other high school subjects	5 units
TOTAL	15 units

3. Must be in the upper half of the high school class.
4. Indiana residents must submit College Board Scholastic Aptitude Test results. Non-resident applicants may submit American College Test results.
5. Satisfactory physical examination, including specified immunizations and tests, and a chest X-ray prior to admission.

All candidates for admission are reviewed by a Nursing Admission Committee which meets four times a year. Students are selected on a competitive basis dependent on their qualifications. Early application in the fall preceding the year of intended enrollment is recommended.

PLAN OF STUDY

FRESHMAN YEAR

Summer Session

(3) CHM 119 (General Chemistry)

First Semester		Second Semester	
(3)	BIOL 203 (Biology of Man)	(3)	BIOL 204 (Biology of Man)
(3)	PSY 120 (Elementary Psychology)	(3)	PCOL 201 (Introductory Pharmacology)
(3)	ENGL 104 (English Composition I)	(3)	F&N 303 (Essentials of Nutrition)
(1)	NUR 114 (Perspectives in Nursing)	(7)	NUR 116 (Nursing II: Medical-Surgical Nursing of Adults and Children)
(7)	NUR 115 (Nursing I: Introduction to Nursing)		
(17)		(16)	

SOPHOMORE YEAR

First Semester		Second Semester	
(3)	BIOL 220 (Introduction to Microbiology)	(3)	Elective
(3)	SOC 100 (Introductory Sociology)	(2)	NUR 260 (Issues in Nursing)
(10)	NUR 224 (Nursing III: Medical-Surgical Nursing of Adults and Children)	(6)	NUR 225 (Maternal Child Health Nursing)
		(6)	NUR 240 (Psychiatric Mental Health Nursing)
(16)		(17)	

Associate Degree graduates may seek admission to the baccalaureate degree nursing program after completing an additional summer session to satisfy lower division requirements.

PRACTICAL NURSING PROGRAM

(Certificate Program)

The Practical Nurse Training Program is a one year non-college-credit course given in cooperation with four area hospitals: Methodist Hospital of Gary; St. Catherine's Hospital, East Chicago; St. Margaret Hospital, Hammond; and St. Mary Medical Center, Gary.

Upon completion, Purdue University awards a certificate. Graduates are eligible to take the Indiana State Board Practical Nurse Licensure Examination.

Practical nurses are prepared to give skilled and uncomplicated nursing care under the supervision of registered nurses and physicians and to function as part of the total health care team.

The program is accredited by the Indiana State Board of Nurses' Registration and Nursing Education and by the National League for Nursing. Classes enter at the beginning of the Fall and Spring semesters. Pre-entrance screening test dates and fees are available from the Nursing Department Office.

Admission Requirements:

1. High school graduation or General Educational Development test equivalency.
2. Satisfactory scores on pre-entrance screening tests.
3. Evidence of suitable physical and emotional characteristics commensurate with giving skilled nursing care.
4. Possession of one's own transportation.
5. Birth certificate; age between 17 and 55.

An admission quota is established for each class in accordance with State Board recommendations regarding available faculty and in accordance with area facilities.

PRACTICAL NURSING CURRICULUM

Certificate Units	Course Number and Title	
	First Semester (16-week Preclinical)	
(1)	NUR 4	Community Health
(2)	NUR 8	Personal and Vocational Relationships
(4)	NUR 12	Anatomy and Physiology
(2)	NUR 14	Introduction to Special Conditions
(2)	NUR 16	Family Living
(3.5)	NUR 20	Nutrition and Diet Therapy
(1)	NUR 22	Pharmacology
(8)	NUR 24	Fundamentals of Nursing
	Second and Third Smesters (Clinical)*	
(6)	NUR 44	Medical Nursing
(6.5)	NUR 56	Surgical Nursing
(6.5)	NUR 64	Maternal and Child Health Nursing
(3)	NUR 74	Pediatric Nursing
(3.5)	NUR 76	Nursing in Long Term Illness

PERSONAL SERVICE COURSES

Students successfully completing personal service courses numbered 1-99 earn certificate units and not University credit.

NUR 4. COMMUNITY HEALTH. Class 1, cert. units 1.

Basic study of community health facilities and of the role of the practical nurse in community health.

NUR 8. PERSONAL AND VOCATIONAL RELATIONSHIPS. Class 2, cert. units 2.

Designed to assist the student in adjustment to the role of the nurse in the hospital and in the community. Emphasis is placed on interaction with patients and personnel. Nursing organization, legal implications in nursing and concepts of professional ethics are presented and discussed.

NUR 12 ANATOMY AND PHYSIOLOGY. Class 4, cert. units 4.

Basic study of human anatomy and physiology functions with limited reference to biology, chemistry and basic science. Lectures incorporate basic knowledge as well as brief introduction to deviations associated with interruption of normal body functions applicable to fundamental nursing care.

NUR 14. INTRODUCTION TO SPECIAL CONDITIONS. Class 2, cert. units 2.

Health maintenance and promotion in common illnesses and normal pregnancy.

NUR 16. FAMILY LIVING. Class 2, cert. units 2.

General principles of growth and development from infancy to old age. Fundamentals of contemporary family structure roles, activities and mental health.

NUR 20. NUTRITION AND DIET THERAPY. Class 3.5, cert. units 3.5.

Basic nutritional principles involved in maintaining optimal health. Normal and therapeutic diets with special emphasis on assisting the patient and his family to understand and accept individualized requirements.

NUR 22. PHARMACOLOGY. Class 1, cert. units 1.

Classification of drugs, the metric and apothecary systems and drug terminology.

NUR 24. FUNDAMENTALS OF NURSING. Class 5, Lab. 8, cert. units 8.

Provides opportunity to develop skills necessary to give nursing care to the subacute, convalescent and chronically ill patient, together with an understanding of the basic principles involved.

NUR 44. MEDICAL NURSING. Class 6, Lab. 29, cert. units 6 (8 weeks).

Practical application of acquired preclinical nursing skill with observation of

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* Clinical Period courses are taken in rotation over a 32 week period.

application of concepts of nutrition, social interaction, mental health concepts and deviations of normal body processes operative in the medical patient.

NUR 56. SURGICAL NURSING. Class 7, Lab. 28, cert. units 6.5, (8 weeks).

Practical application of preclinical nursing skills with further development of nursing principles basic to care of the surgical patient.

NUR 64. MATERNAL AND CHILD HEALTH NURSING. Class 7, Lab. 28, cert. units 6.5 (8 weeks).

Practical application of nursing skills with the patient in labor, delivery, and the postpartum setting, and with the newborn infant.

NUR 74. PEDIATRIC NURSING. Class 7, Lab. 28, cert. units 3 (4 weeks).

Application of nursing skills with the critically and chronically ill child. Includes further development of the principles of growth, social interaction, nutrition and mental health.

NUR 76. NURSING IN LONG TERM ILLNESS. Class 8, Lab. 27, cert. units 3.5 (4 weeks).

Application of nursing skills with the aged and chronically ill adult. Provides opportunity to develop understanding of degenerative changes, preventive nursing measures, and rehabilitation concepts.

UNDERGRADUATE COURSES

NUR 100. GUIDED READINGS IN NURSING. Class 1, cr. 1.

For nursing students and/or others with an interest related to nursing practice. Current literature and events related to nursing.

NUR 114. PERSPECTIVES IN NURSING. Class 1, cr. 1.

Analyze the history of nursing and its relationship to the role of the nurse in society today. Know beginning legal and ethical implications for the nurse. Focus on student problems encountered in beginning clinical practice.

NUR 115. NURSING I: INTRODUCTION TO NURSING. Class 4, Lab. 9, cr. 7.

Explores the concepts of health, illness, man's pursuit of wholeness and nursing intervention through the use of the nursing process. Basic human needs, interpersonal relationships, and dynamics of behavior are studied. Laboratory experience is provided in the college, hospitals, and other community agencies.

NUR 116. NURSING II: MEDICAL-SURGICAL NURSING OF ADULTS AND CHILDREN. Class 4, Lab. 9, cr. 7.

Applies the nursing process to the care of adults and children who experience problems related to selected basic human needs. Surgical intervention as a stress situation is studied. Laboratory experiences are provided in hospitals and other agencies.

NUR 224. NURSING III: MEDICAL-SURGICAL NURSING OF ADULTS AND CHILDREN. Class 5. Lab. 15, cr. 10.

Utilizes the nursing process in caring for adults and children who experience complex problems related to selected basic human needs. Laboratory experiences are provided in hospitals and other community agencies.

NUR 225. MATERNAL CHILD HEALTH NURSING. Class 3, Lab. 9, cr. 6.

Applies the nursing process in caring for the emerging family group throughout the maternal cycle, and childhood. Includes the study of normal growth and development and the care of children with diseases unique to childhood. Laboratory experiences are provided in hospitals and other community agencies.

NUR 240. PSYCHIATRIC MENTAL HEALTH NURSING. Class 3, Lab. 9, cr. 6.

Integrates the pursuit of wholeness with a study of personality structure and common psychiatric disorders. Applies principles of individual and group behavior to the emotionally ill. Laboratory experiences are provided in hospitals and other community agencies.

NUR 260. ISSUES IN NURSING. Class 2, cr. 2.

Study challenges, responsibilities, and employment opportunities for the registered nurse. Examine current trends in health care, professional issues, nursing practice standards, legal aspects or nursing, and implications of health legislation.

NUR 290. GUIDED STUDY IN NURSING. Class 1-6, cr. 1-6.

Designed to provide core curriculum requirements in nursing for individual students enrolled in the baccalaureate program.

NUR 300. NURSING CONCEPTS I. Class 6, Lab. 12, cr. 10 (Variable Module course pattern) Prerequisite: Lower Division Requirements or by consent of instructor. Corequisite: BIOL 301.

The theoretical constructs in nursing are explored. Beginning assessment skills and techniques are practiced with emphasis on physical assessment, health histories, and interviewing techniques. The health care system is evaluated and health promotion is emphasized.

NUR 301. NURSING CONCEPTS II. Class 5, Lab. 15, cr. 10. (Variable Module course pattern) Prerequisite: NUR 300 or by consent of instructor, BIOL 301. Corequisite: BIOL. 302.

Assessment skills and techniques are continued. Beginning families and families with school age children in the community are the focus. The high-risk mother and infant, drug abuse problems, and dynamics of groups and families are studied in depth.

NUR 399. SPECIAL TOPICS. Class 0-4, Lab. 0-6, cr. 1-6.

Hours, credit, and subject matter to be arranged by staff. Course may be repeated for credit up to nine hours.

NUR 400. NURSING CONCEPTS III. Class 5, Lab. 15, cr. 10 (Variable Module course pattern) Prerequisite: NUR 300, NUR 301. Corequisite: EET 415.

An indepth analysis of the health care needs of the family in the middle years and of those of the aged in the community setting. Emphasis is placed on the management of clients with acute and chronic conditions. The student may select an area of interest for concentrated study.

NUR 401. NURSING CONCEPTS IV. Class 5, Lab. 15, cr. 10 (Variable Module course pattern) Prerequisite: NUR 300, NUR 301, NUR 400, COM 320. Corequisite: CPT 300.

Special problems in management of long term illnesses are examined. Medical-legal problems and nursing issues affecting the generalist professional nurse practitioner are analyzed. Research problems are examined and use of the results of recent research is encouraged.

DEPARTMENT OF PHYSICS

Jaming Pan, Head

FACULTY: P. V. Flannery, P. D. Gupta, S. K. Gupta, G. R. Mitchell, V. Namias, J. Pan, F. Susienka, M. Svonavec.

The Department of Physics at the Calumet Campus offers two programs, plan I and II, leading to the Bachelor of Science degree

Plan I is intended to be suitable for a wide variety of students interested in physics, including those desiring a broad general education together with specialization in physics. Plan I gives a more than adequate background for advanced study at the physics graduate schools. Electives are offered so that the student may select emphasis in Pure Physics, Applied Physics, Biophysics or Technical Management: Plan II is designed for prospective teachers of physics in high schools. Such students should note that, in addition to meeting the requirements for the degree, it is essential for them to complete the requirements for certification imposed by the state in which they expect to teach.

ADMISSION REQUIREMENTS

Admission to the Physics major program requires that the student be in the upper one-half of his high-school class or in the upper one-third for out-of-state students. Admission requirements include the following subjects: three semesters of high-school algebra, two semesters of geometry, and one semester of trignometry. A total of eight semesters of high school math is preferable and should include an introduction to calculus and analytical geometry. Admission requirements also include two semesters of laboratory science and six semesters of English. The SAT or ACT tests must be taken.

PASS/NOT PASS OPTION

In addition to the grades A, B, C, etc., traditionally assigned to students to indicate the level of their performance in courses, an alternate grading system, the pass/not pass option, has been established. A primary purpose of this option is to provide students with the opportunity to broaden their educational foundations with minimal concern for grades earned.

All the following restrictions apply to the courses used to satisfy graduation requirements.

1. The option is open only to students who are classified as sophomores or upper division students with an index of 4.5 or above.
2. A student is to take no more than two courses per year and not more than 20 percent of the total credit hours required for his graduation. Summer session courses shall apply to the year preceding the summer session.
3. So far as courses presented to satisfy degree requirements are concerned, only free electives and courses in the 18-hour block (see section 4 on page 23) in humanities and behaviorial and social sciences may be taken under the pass/not pass option. *Such courses may be used to satisfy the 18-hour block only if those chosen are more advanced than those usually elected at the student's level.*
4. The pass/not pass option may *not* be elected for any course which already appears on the student's academic record (e.g., a student who withdrew from a course after the end of the drop/add period receives and has made a part of his academic record the grade W in this course. He cannot subsequently enroll in this course on the pass/not pass option).
5. The registrar's class rosters will indicate which students have elected this option.
6. A student who is enrolled in a course under this option has the same obligations as those who are enrolled in the course for credit with letter grade. When the instructor reports final grades in the course, he will report that any such student who would have earned a grade of A, B, or C has passed the course, and that any other such student has not passed. The registrar will make an appropriate notation on the student's academic record in place of a letter grade but will not use the course in computing grade indices.

DEGREE REQUIREMENTS

In order to receive a physics degree in Plan I or II, a student must maintain a grade-point average of 4.0 or above in all physics courses. Students will be allowed to transfer from other fields to a major in physics only if they have a grade point average of 4.0 in all physics and mathematics courses completed up to that time and have received a grade below C in not more than one such course.

1. General requirements
   a. A total of 12 semester hours. An average of 15½ hours per semester is sufficient to accumulate 124 hours in eight semesters. Students

with a graduation index less than 5.0 are advised not to take more than 17 hours in any one semester.

b. English composition. One year of English composition, or ENGL 103 entered by achievement examination and completed with a grade of C or better. Students who complete ENGL 104 with a grade of A may substitute any literature or writing course for ENGL 105.

c. Modern foreign language. Pass a fourth-semester college-level course in a modern foreign language, or pass an equivalent proficiency examination. The student who successfully completes the professional semester in a high school teaching curriculum need only pass a second-semester college-level course in a modern language or pass a proficiency examination.

d. Twenty-four hours of mathematics, including MA 163, 164, 261 and 262, or equivalent.

e. Eight hours of chemistry (CHM 115 and 116 or equivalent).

f. Six additional hours of science courses chosen from biology, chemistry, geosciences, computer sciences, and engineering. The courses chosen must be drawn from not more than two sciences.

g. Humanities, social studies, and behavioral sciences. Three areas are:

   a. literature, philosophy, creative arts;
   b. history, political science;
   c. economics, sociology, psychology.

   The minimum requirement is 18 hours chosen from the above three areas. Six hours must be chosen from each of two of them. A coherent two-courses sequence must be included. It is strongly recommended that the student take more than a minimal program. The student should consult his adviser as to the most efficient individual manner of completing this flexible requirement.

2. Physics requirements

   a. Plan I. PHYS 152, 251, 310, 322, 330, 342, 342L, 350, 351, 515, and 550.
   b. Plan II. PHYS 152, 251, 310, 322, 330, 342, 342L, 350, 351, and 550. In addition, the student is required to take a course in astronomy in order to meet teacher-certification requirements.

After 30 hours of college credit, a student pursuing programs for teacher certification must comply with the following requirements:

1. Complete ED 285 (Educational Psychology)
2. Meet the minimum academic requirements:
   a. 4.0 in English composition
   b. 4.0 in teaching major
   c. 4.0 graduation index
3. Pass a speech and hearing test
4. Be admitted to teacher education

A student must file his application for student teaching by February 15 of the year prior to the academic year in which he plans to do student teaching. Applications for student teaching will be accepted only from students who have been admitted to teacher education.

3. Sample programs

Sample programs under the two plans follow. The "electives" denote courses needed to complete general degree requirements, or free electives. It should be noted that the Plan II program provides for a minor in mathematics as well as a major in physics.

Plan I a. Regular

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition I)	(4)	PHYS 152 (Mechanics and Sound)
(4-5)	CHM 115 (General Chemistry) or CHM 117 (Advanced General Chemistry)	(4-5)	CHM 116 (General Chemistry) or CHM 126 (Advanced General Chemistry with Qualitative Analysis)
(3)	Modern language	(3)	Modern language
(15-16)		(16-17)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(5)	PHYS 251 (Heat, Electricity, and Optics)	(3)	PHYS 342 (Modern Physics)
(3)	ENGL 105 (English Composition II)	(1)	PHYS 342L (Modern Physics Laboratory)
(3)	Modern language	(3)	Modern language
		(6)	Electives
(15)		(17)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	PHYS 310 (Intermediate Mechanics)	(3)	PHYS 330 (Intermediate Electricity and Magnetism)
(3)	PHYS 322 (Oscillations and Waves)	(2)	PHYS 351 (Intermediate Laboratory II)
(2)	PHYS 350 (Intermediate Laboratory)	(3)	Mathematics elective
(3)	Mathematics elective	(9)	Electives
(6)	Electives		
(18)		(17)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	PHYS 550 (Introduction to Quantum Mechanics)	(12)	Electives
(12)	Electives	(3)	PHYS 515 (Thermodynamics)
(15)		(15)	

b. Applied physics option

FRESHMAN YEAR

First Semester		Second Semester	
(3)	Elective (Humanity)	(3)	ENGL 105 (English Composition)
(5)	MA 163 (Integrated Calculus and Analytic Geometry)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition)	(3)	MODERN LANGUAGE
(3)	MODERN LANGUAGE	(4)	PHYS 152 (Mechanics and Sound)
(14)		(15)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MODERN LANGUAGE	(3)	MODERN LANGUAGE
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(4)	PHYS 261 (Electricity and Optics)	(3)	PHYS 342 (Modern Physics)
(4)	Option Electives	(1)	PHYS 342L (Modern Physics Laboratory)
		(5)	Option Electives
(15)		(16)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	PHYS 310 (Intermediate Mechancis)	(3)	PHYS 330 (Intermediate Electricity and Magnetism)
(3)	PHYS 322 (Oscillations and Waves)	(2)	PHYS 351 (Intermediate Laboratory II)
(2)	PHYS 350 (Intermediate Laboratory I)	(3)	Mathematics elective
(7)	Option Electives	(3)	Option Electives
		(6)	Electives
(16)		(17)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(4)	CHM 115 (General Chemistry)	(3)	Electives
(3)	PHYS 550 (Introduction to Quantum Mechancis)	(3)	Mathematics elective
(3)	Option elective	(6)	Physics elective
(6)	Electives	(4)	CHM 116 (General Chemistry)
(16)		(16)	

c. Biophysics option

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition I)	(4)	PHYS 152 (Mechanics and Sound)
(4-5)	CHM 115 (General Chemistry) or CHM 117 (Advanced General Chemistry)	(4-5)	CHM 116 (General Chemistry) or CHM 126 (Advanced General Chemistry with Qualitative Analysis)
(3)	Modern language	(3)	Modern language
(15-16)		(16-17)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(5)	PHYS 251 (Heat, Electricity, and Optics)	(3)	PHYS 342 (Modern Physics)
(3)	BIOL 103 (Principles of Biology)	(1)	PHYS 342L (Modern Physics Laboratory)
(3)	MODERN LANGUAGE	(3)	MODERN LANGUAGE
		(3)	BIOL 104 (Principles of Biology)
		(3)	ENGL 105 (English Composition)
(15)		(17)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	PHYS 310 (Intermediate Mechanics)	(3)	PHYS 330 (Intermediate Electricity and Magnetism)
(3)	PHYS 322 (Oscillations and Waves)	(2)	PHYS 351 (Intermediate Laboratory II)
(2)	PHYS 350 (Intermediate laboratory I)	(3)	Mathematics elective
(3)	Mathematics Elective	(3)	Option elective
(4)	Option Elective	(6)	Electives
(16)		(17)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	PHYS 550 (Introduction to Quantum Mechanics)	(4)	Option electives
(7)	Option electives	(3)	Physics electives
(6)	Elective	(3)	Mathematics elective
		(6)	Electives
(16)		(16)	

d. Technical Management Option

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition I)	(4)	PHYS 152 (Mechanics and Sound)
(4-5)	CHM 115 (General Chemistry) or CHM 117 (Advanced General Chemistry)	(4-5)	CHM 116 (General Chemistry) or CHM 126 (Advanced General Chemistry with Qualitative Analysis)
(3)	Modern language	(3)	Modern language
(15-16)		(16-17)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(5)	PHYS 251 (Heat, Electricity, and Optics)	(3)	PHYS 342 (Modern Physics)
(3)	INDM 200 (Introductory Accounting)	(1)	PHYS 342L (Modern Physics Laboratory)
(3)	Modern language	(3)	Modern language
		(3)	ENGL 105 (English Composition II)
		(3)	INDM 201 (Cost Accounting)
(15)		(17)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	PHYS 310 (Intermediate Mechanics)	(3)	PHYS 330 (Intermediate Electricity and Magnetism)
(3)	PHYS 322 (Oscillations and Waves)	(2)	PHYS 351 (Intermediate Laboratory II)
(2)	PHYS 350 (Intermediate Laboratory I)	(3)	Mathematics elective
(3)	ECON 251 (Microeconomics)	(3)	ECON 252 (Macrofinance)
(3)	INDM 310 (Financial Management)	(3)	INDM 320 (Marketing Management)
		(3)	Electives
(15)		(17)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	PHYS 550 (Introduction to Quantum Mechanics)	(12)	Electives
(3)	CS 210 (Laboratory on Data Processing)	(3)	PHYS 515 (Thermodynamics)
(3)	Mathematics elective		
(6)	Electives		
(15)		(15)	

Plan II. Physics Teaching Major

FRESHMAN YEAR

First Semester		Second Semester	
(5)	MA 163 (Integrated Calculus and Analytic Geometry I)	(5)	MA 164 (Integrated Calculus and Analytic Geometry II)
(3)	ENGL 104 (English Composition I)	(4)	PHYS 152 (Mechanics and Sound)
(4-5)	CHM 115 (General Chemistry) or CHM 117 (Advanced General Chemistry)	(4-5)	CHM 116 (General Chemistry) or CHM 126 (Advanced General Chemistry with Qualitative Analysis)
(3)	Elective	(3)	Elective
(15-16)		(16-17)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(4)	MA 261 (Multivariate Calculus)	(4)	MA 262 (Linear Algebra and Differential Equations)
(5)	PHYS 251 (Heat, Electricity, and Optics)	(3)	PHYS 342 (Modern Physics)
(3)	ENGL 105 (English Composition II)	(6)	Electives
(3)	Elective	(3)	ED 285 (Educational Psychology)
(15)		(16)	

JUNIOR YEAR

Fifth Semester		Sixth Semester	
(4)	PHYS 310 (Intermediate Mechanics)	(3)	PHYS 330 (Intermediate Electricity and Magnetism)
(3)	PHYS 322 (Oscillations and Waves)	(2)	PHYS 351 (Intermediate Laboratory II)
(2)	PHYS 350 (Intermediate Laboratory I)	(3)	Mathematics elective
(3)	Mathematics elective	(3)	Modern language
(3)	Modern language	(6)	Electives
(15)		(17)	

SENIOR YEAR

Seventh Semester		Eighth Semester	
(3)	PHYS 550 (Introduction to Quantum Mechanics)	(15)	Professional Semester: prescribed curriculum in education
(13)	Electives		
(16)		(15)	

PHYSICS

UNDERGRADUATE LEVEL

PHYS 118. EVOLUTION OF PHYSICS. Class 3, cr. 3. Recommended for students of the School of Humanities, Social Science, and Education.

A descriptive nonmathematical exploration of the ideas responsible for three great revolutions in man's view of the universe; those leading to the Copernican view of the solar system. Einstein's view of space and time, and the quantum picture of the fundamental constituents of matter. Biographical material is read to give insight into the human aspects of these scientific achievements.

PHYS 152. MECHANICS. Class 4, Lab. 2, cr. 4. Prerequisite or corequisite: MA 164 or equivalent.

Statics, uniform and accelerated motion; Newton's laws; circular motion; energy, momentum, and conservation principles; dynamics of rotation; gravitation and planetary motion; hydrostatics and hydodynamics; simple harmonic motion and wave motion.

PHYS 205. SURVEY OF PHYSICS. Class 5, cr. 4. Prerequisite: MA 111 or equivalent.

General physics for students of agriculture and forestry.

PHYS 210. THE NATURE OF PHYSICAL SCIENCE I. Class 2, Lab. 3, cr. 3.

Development of basic concepts and theories in physical science; a terminal course.

PHYS 211. THE NATURE OF PHYSICAL SCIENCE II. Class 2, Lab. 3, cr. 3. Prerequisite: PHYS 210 or equivalent.

Continuation of PHYS 210. PHYS 210 and 211 will satisfy the physical science requirement in the School of Humanities, Social Science, and Education.

PHYS 218. GENERAL PHYSICS. Class 4, Lab. 2, cr. 4. Prerequisites: MA 150 or 111 and 112.

Mechanics, heat, and sound, primarily for technology students.

PHYS 219. GENERAL PHYSICS. Class 4, Lab. 2, cr. 4. Prerequisite: PHYS 218.

Electricity, light, and modern physics, primarily for technology students.

PHYS 220. GENERAL PHYSICS. Class 3, Lab. 2, cr. 4. Prerequisites: College algebra and trigonometry.

Mechanics, heat and sound, for students not specializing in physics.

PHYS 221. GENERAL PHYSICS. Class 3, Lab. 2, cr. 4. Prerequisite: PHYS 220.

Electricity, light, and modern physics, for students not specializing in physics.

PHYS 251. HEAT, ELECTRICITY, AND OPTICS. Class 5, Lab. 2, cr. 5. Prerequisite: PHYS 152.

Heat, kinetic theory, elementary thermodynamics, heat transfer. Electrostatics, current electricity, electromagnetism, magnetic properties of matter; geometrical and physical optics.

PHYS 261. ELECTRICITY AND OPTICS. Class 5, cr. 4. Prerequisite: PHYS 152; prerequisite or corequisite: MA 261.

Electricity and magnetism with emphasis on fields and the use of vector analysis; geometrical and physical optics.

PHYS 270. SPECIAL TOPICS IN PHYSICS. Cr. 1-5. Admission by special permission.

Specialized topics in physics. May be repeated for credit.

PHYS 310. INTERMEDIATE MECHANICS. Class 4, cr. 4. Prerequisites: MA 261 and two terms of general physics.

For students familiar with calculus. Elements of vector algebra; statics of particles

and rigid bodies; theory of couples; principle of virtual work; kinematics; dynamics of particles and rigid bodies; work, power, and energy; elements of hydromechanics and elasticity.

PHYS 322. OSCILLATIONS AND WAVES. Class 3, cr. 3. Prerequisite: PHYS 251 or equivalent.

Modes of vibration of a system; emission and absorption of waves; properties of sound, electromagnetic, and particle waves including phenomena of refraction, reflection, dispersion, diffraction, interference, polarization, and double refraction.

PHYS 330. INTERMEDIATE ELECTRICITY AND MAGNETISM. Class 3, cr. 3. Prerequisite: PHYS 251 or equivalent; prerequisite or corequisite: MA 262.

Electrostatics; electric currents; magnetostatics; electromagnetic induction; Maxwell's equations; electromagnetic waves.

PHYS 342. MODERN PHYSICS. Class 4, cr. 3. Prerequisite: PHYS 251 or 261.

A survey of basic concepts and phenomena in atomic, nuclear, and solid state physics.

PHYS 342L. MODERN PHYSICS LABORATORY. Lab. 2, cr. 1.

Laboratory experiments to accompany PHYS 342.

PHYS 350. INTERMEDIATE LABORATORY I. Class 1, Lab. 3, cr. 2. Prerequisite or corequisite: PHYS 322.

Lectures on geometrical optics; instructor demonstrations and student experiments involving mechanical and electromagnetic wave and oscillation phenomena.

PHYS 351. INTERMEDIATE LABORATORY II. Class 1, Lab. 3, cr. 2. Prerequisite or corequisite: PHYS 330.

Lectures on AC circuit theory; instructor demonstrations and student experiments involving particle diffraction, wave polarization, double refraction, AC circuits, and meters.

PHYS 352. INTERMEDIATE LABORATORY III. Class 1, Lab. 3, cr. 2. Prerequisites: PHYS 342 and 351.

Lectures and experiments on electromagnetic waveguides for wavelengths from the microwave to radio region, photoelectric effect, energy levels in atoms, magnetic susceptibility. Compton effect, nuclear line spectra, nuclear magnetic resonance.

PHYS 470. SPECIAL TOPICS IN PHYSICS. Cr. 1-5. Admission by special permission. May be repeated for credit.

DUAL LEVEL
Undergraduate-Graduate

PHYS 500. FUNDAMENTAL PHYSICS I. Class 1, Lec. Dem. 2, cr. 2. Prerequisite: a course in college physics. Admission by consent of instructor.

An intensive review of mechanics, wave motion and kinetic theory and the extensions of the laws in these domains to relativity and current investigations and applications. The course is specifically designed for teachers of science in the secondary schools.

PHYS 501. PHYSICAL SCIENCE I. Class 3, cr. 3. Prerequisite: a course in college physics.

A survey of the physical sciences with emphasis on the overlap of astronomy, physics, chemistry, and geophysics. Consideration of appropriate methods of presentation and demonstration of experiments in physical science for the elementary school. PHYS 501 and 502 can be taken for graduate credit only in elementary-teacher programs.

PHYS 502. PHYSICAL SCIENCE II. Class 3, cr. 3. Prerequisite: PHYS 501 or consent of instructor.

A continuation of PHYS 501 with emphasis on electricity, optics and modern physics.

PHYS 503. FUNDAMENTAL CONCEPTS OF PHYSICS. Class 3, cr. 3. Prerequisite: a course in college physics. Admission by consent of instructor.

An intensive review of the principles of physics specifically designed for teachers of the physical sciences in high school. Special emphasis will be placed on mechanics, kinetic theory, electric and magnetic fields, and the propagation of electromagnetic radiation.

PHYS 504. PRINCIPLES OF PHYSICS I. Class 2, cr. 2. Prerequisites: college physics and mathematics through calculus.

A review of classical physics, with emphasis on the unifying principles operating in the various domains. Stress will be placed on the operational approach, the conservation principles, and the field the-

ory law of gravitation and electromagnetism. Designed primarily for secondary school teachers.

PHYS 506. FUNDAMENTAL PHYSICS II. Class 1, Lec. Dem. 2, cr. 2. Prerequisite: PHYS 500 or equivalent.

An intensive review of electricity, magnetism and light, and an introduction to quantum phenomena and atomic and nuclear structure. The course is specifically designed for teachers of science in the secondary schools.

PHYS 508. INTRODUCTION TO THEORETICAL PHYSICS I. Class 3, cr. 3. Prerequisite or corequisite: PHYS 504.

Vector algebra and calculus; dynamics of particles and rigid bodies; gravitation and planetary motion; oscillations and waves; thermodynamics. Designed primarily for secondary school teachers.

PHYS 509. INTRODUCTION TO THEORETICAL PHYSICS II. Class 3, cr. 3. Prerequisite: PHYS 508 or equivalent.

Kinetic theory and statistical mechanics; electromagnetism and Maxwell's equations; physical optics; wave mechanics. Designed primarily for secondary school teachers.

PHYS 510. PHYSICAL MECHANICS. Class 3, cr. 3. Prerequisites: PHYS 310 or equivalent. PHYS 330 or equivalent, and courses in calculus and differential equations.

Mechanics of particles, rigid bodies, and vibrating systems; elasticity and hydrodynamics; theory of relativity.

PHYS 515. THERMODYNAMICS. Class 3, cr. 3. Prerequisites: PHYS 310 and 330 and a course in differential equations or advanced calculus.

Fundamental concepts of heat; theory and practice of heat measurements; first and second laws of thermodynamics, with applications.

PHYS 517. STATISTICAL PHYSICS. Class 3, cr. 3. Prerequisites: PHYS 342, 510, and 515 or equivalent.

Kinetic theory of gases, third law of thermodynamics, and the principles of statistical mechanics, with applications to the quantum theory of radiation and the theory of specific heats.

PHYS 530. ELECTRICITY AND MAGNETISM. Class 3, cr. 3. (el.) Prerequisite: PHYS 330 or equivalent.

An introductory theoretical course. Vector analysis; electrostatic problems; theory of dielectrics; theory of conduction; thermoelectric and photoelectric phenomena; electromagnetic effects due to steady and changing currents; magnetic properties of matter; Maxwell's equations; radiation.

PHYS 542. SURVEY OF MODERN PHYSICS I. Class 3, cr. 3. Prerequisites: general physics and calculus. Restricted for graduate credits to candidates in education or science teaching.

Elementary particles. Relativity. Quantum theory. Atomic spectra and X-rays. Pauli principle. Wave mechanics. Radiation and statistics.

PHYS 545. SOLID STATE PHYSICS. Class 3, cr. 3. Prerequisite: PHYS 550 or equivalent.

Crystal structure; lattice vibrations and electronic band structure of crystals; electrical, optical, and thermal properties of solids; transport and other nonequilibrium phenomena in uniform and nonuniform materials.

PHYS 549. SURVEY OF MODERN PHYSICS II. SS. Class 3, cr. 3. Prerequisite: PHYS 542 or equivalent.

Solid state physics; nuclear particles and forces; natural and artificial radioactivity; particle accelerators; nuclear reactions; fission and fusion. Designed primarily for secondary school teachers.

PHYS 550. INTRODUCTION TO QUANTUM MECHANICS. Class 3, cr. 3. Prerequisites: PHYS 310 or 330, 342, MA 302 or 501, or equivalent.

Brief historical survey of the development of quantum mechanics; waves in classical physics, wavepackets, uncertainty principle, wave functions, operators, expectation values of dynamical observables; Schrödinger equation with application to one-dimensional problems, the hydrogen atom; electron spin, periodic table; selected topics in perturbation theory, scattering theory and compounding of angular momenta. Designed for students needing quantum mechanics background for specialty courses such as PHYS 545, 556, and 564.

PHYS 556. INTRODUCTORY NUCLEAR PHYSICS. Class 3, cr. 3. Prerequisite: PHYS 550 or equivalent.

Theory of relativity, brief survey of systematics of nuclei and elementary particles, structure of stable nuclei, radioactivity, interaction of nuclear radiation

with matter, nuclear reactions, particle accelerators, nuclear instruments, fission, nuclear reactors.

PHYS 564. INTRODUCTION TO ELEMENTARY PARTICLE PHYSICS. Class 3, cr. 3. Prerequisite: PHYS 550 or 552 or equivalent.

Historical survey of the discovery of elementary particles. Methods of detecting charged particles. Modern particle accelerators. Kinematics and quantum mechanics of scattering and decay of particles; conservation of four-momentum and angular momentum; phase space. Charge structure of particles; form factors. Strong interactions; resonances in pion-nucleon and pion-pion systems; effective mass, Dalitz, and Chew-Low plots; qualitative introduction to Feynman diagram techniques in single particle exchange processes; T.C.P. invariance; isopin; strangeness, G-parity; Gell-Mann Nishijima formula. Electromagnetic and weak interactions; violation of strong interaction symmetries, interpretation of particle spectra in terms of SU (3) symmetry, the quark model and Regge theory.

PHYS 590. READING AND RESEARCH. Cr. 1-3.

Geosciences

UNDERGRADUATE LEVEL

GEOS 100. FRONTIERS IN GEOSCIENCES. Class 3, cr. 3. Recommended for both science and nonscience students.

A description of the combination of physical processes, natural laws, and interactions with man which serve to influence the changing character of the earth and its neighbors in space. A survey of current efforts by geoscientists to expand their understanding of man's environment.

GEOS 220. SURVEY OF PHYSICAL GEOGRAPHY. Class 2, Lab. 3, cr. 3.

A study of landforms, climates, soils, and resources that comprise the world's natural environments; includes the elements of cartography and geodetic measurements.

GEOS 361. INTERMEDIATE ASTRONOMY I. Class 3, cr. 3. Prerequisite or corequisite: PHYS 251, MA 162, or consent of instructor.

Intermediate level introduction to solar system, astronomical instruments, radio astronomy, celestial mechanics, space research for science students.

GEOS 362. INTERMEDIATE ASTRONOMY II. Class 3, cr. 3. Prerequisite or corequisite: PHYS 251, MA 162, or consent of instructor.

Intermediate level introduction to stellar astronomy and astrophysics, including physical properties of stars and sun, variable stars, pulsars, Milky Way galaxy, external galaxies, quasars, cosmology.

STATISTICS—See Department of Mathematical Sciences

SUPERVISION—See Department of Manufacturing Technology

The Community College

D. E. Johnson, Acting Dean

The Community College is a young and developing school of Purdue University. It was established to provide post-high school educational opportunities for students for whom such opportunities were not previously available and to meet community needs in Northwest Indiana for the training of personnel. As needs for trained personnel in business, industry, government and human resources agencies are identified by the University and the community, programs are being designed in the Community College which provide career

ladders and new career opportunities in cooperation with governmental and private agencies. A program currently exists in the Community College for the training of aides and paraprofessionals in elementary and secondary schools. The Community College also offers a two-year Associate of Arts degree in Human Services: Day Care—Child for the training of paraprofessionals in day care centers.

Students will be admitted to the Community College who:

1. wish to pursue a specific degree offered in the college.
2. do not meet the current entrance requirements of the other schools of the University.
3. are seeking university education but are undecided as to their specific educational objectives.
4. have well-defined educational objectives but whose academic goals are not represented by the degree programs in a school of the University.

For the student who would like to enter another school of the University, but does not meet its entrance requirements, the Community College will help design a program of study to meet the individual need. This program of study will help the student meet those requirements and will, at the same time, provide him advanced standing in the school of his choice.

For the student who is undecided about specific educational goals, the Community College, through its Advising Center, using the career counseling facilities of the University, will help design an appropriate program of study. This program will permit the student to take introductory courses in the fields of his interest prior to making a decision on a major field.

For the student with academic interests which are not represented in the degree programs at Purdue University, the Community College provides the opportunity to select university courses which will be transferable to the college or university of his choice.

COMMUNITY COLLEGE ADVISING CENTER

One of the most important services of the Community College is the Advising Center. One of the keys to succeeding in college is the careful selection of courses based on past academic performance and on current factors such as employment, family responsibilities, and other obligations. The Community College academic advisor, along with the student, will select the types of courses and number of courses which will meet the needs of the student and maximize his potential to achieve academic success.

This Advising Center is available to day and evening students. Students are required to confer with their academic advisor at least once each semester prior to registratiton for classes. Academic advisors in the Community College strongly encourage students having more than one academic conference per semester, however. The Advising Center provides information and referral to its students to other services of the university, such as vocational and personal counselling, appropriate financial aids, tutoring, as well as academic advising. This information and referral system has proven to be particularly helpful to students in their first year of attendance at Purdue.

TRANSFER TO OTHER SCHOOLS OF THE UNIVERSITY

Community College courses and programs of study are closely related to those of the Schools of Basic and Applied Sciences and Humanities, Education, and Social Sciences at the Calumet Campus, and to each of the schools on the West Lafayette Campus. Many students will begin their academic careers in the Community College and will then transfer easily to another school of the University, either at the Calumet Campus or at the West Lafayette Campus to complete majors not offered at the Calumet Campus. Information about academic programs in the other schools and on other campuses of the University is available from the office of the Dean of the Community College or from the Community College student's academic advisor.

ASSOCIATE OF ARTS—HUMAN SERVICES: DAY CARE—CHILD

Recognizing the direction of social change in employment patterns for women and the increased awareness of the continuity of human development, this Associate of Arts degree is designed to enlarge the understanding and improve the skills of those who plan, or are engaged in, careers in the development and care of the pre-school age child. The curriculum enables students to fulfill the current (1974) Indiana State requirements for licensed Day Care Center personnel. The graduate is qualified to hold the following positions:

1. Director of a day nursery licensed for thirty (30) children or less.
2. Head teacher in a day nursery licensed for *more* than thirty (30) children.

The curriculum is three-pronged, providing:

1. an intensive evaluation of the biological, psychological, and sociological processes inherent in human development, with greatest attention to the pre-school years. The student is provided an integrated theoretic and practical experience in planning and implementing developmentally-oriented child-care programs.
2. a more extensive view of the psycho-social dynamics of child-family-society, with emphasis on interpersonal skills and relationships.
3. an opportunity to develop individualized skills and interests.

This program fully articulates with the bachelors degree in sociology or psychology.

Recognizing that many potential students hold day-time positions in Day Care Centers and other areas of employment, the majority of the core courses are scheduled during the evening hours. The practicum courses (GNS 133, 233, 235, and 236) of necessity are scheduled during the day-time hours.

PLAN OF STUDY

Fall—Semester 1

(3) PSY 120 (Elementary Psychology)
(3) GNS 131 (Human Development I)
(3) GNS 134 (Human Services)

(9)

Spring—Semester 2

(3) PSY 235 (Child Psychology)
(3) GNS 132 (Human Development II)
(1) GNS 133 (Practicum in Human Services I)
(1) GNS 231 (Seminar in Human Services)

(10)

Summer

(3) GNS 232 (Techniques of Human Assessment)
(3) SOC 100 (Introductory Sociology)

(6)

Fall—Semester 3

(2) BIOL 203 (Biology of Man)
or
(3) BIOL 205 (Biology for Elementary School Teachers)
(3) GNS 260 (Nutrition for Human Development)
(2) GNS 235 (Content Workshop Seminar I)

(10)

Spring—Semester 4

(3) BIOL (Biology of Man)
or
(3) BIOL 206 (Biology for Elementary School Teachers)
(3) PSY 348 (Group & Human Relations)
(2) GNS 236 (Content Workshop Seminar II)
(1) GNS 233 (Practicum in Human Services II)

(11)

Summer

(3) ENGL 104 (English Composition I)
(3) COM 114 (Fundamentals of Speech)

(6)

Fall—Semester 5

(3) SOC 350 (Social Psychology of Marriage)
(3) Elective
(3) Elective
(3) Elective

(12)

Minimum of 60 hours for graduation

SPECIAL SERVICE COURSES

GNS 20. FUNDAMENTALS OF WRITING. Class 3, cr. 0.

A review of writing fundamentals for those who need further training and practice. Emphasis will be on English grammar, punctuation, spelling, sentence structure, and paragraph organization.

UNDERGRADUATE LEVEL

GNS. 100. ACADEMIC DEVELOPMENT. Class 3, cr. 3.

Designed to assist entering students in gaining knowledge of educational opportunities at Purdue Calumet. Information, testing, and discussions are geared to help students with academic and career decesions.

GNS 120. TEACHING COMMUNICATION SKILLS AND SOCIAL STUDIES IN THE ELEMENTARY SCHOOL I. Sem. 1. Class 3, cr. 3.

Part I of a two-part core course combining the teaching of the language arts, including materials and methods of teaching oral and written language, listening, spelling, and handwriting with the teaching of social studies; including curriculum principles and objectives, and evaluation procedures. An integral part of the course will be supervised teaching experiences in the assigned elementary school classroom with emphasis on preparation and presentation of language arts and social studies learning activities. Offered for paraprofessional training in education only.

GNS 121. TEACHING COMMUNICATION SKILLS AND SOCIAL STUDIES IN THE ELEMENTARY SCHOOL II. Sem. 2. Class 3, cr.3. Continuation of GNS 120

GNS 131. HUMAN DEVELOPMENT I. Class 3, cr. 3.

A didactic review of critical developmental problems over the entire life cycle, stressing their theoretical and rational understanding. Offering recommendations for dealing with these problems and directing the activities of the cared-for which best serve their needs and those of the care milieu.

GNS 132. HUMAN DEVELOPMENT II. Class 3, cr. 3.

A didactic review of critical developmental problems over the entire life cycle, stressing their theoretical and rational understanding. Offering recommendations for dealing with those problems and directing the activities which best serve their needs and those of the care milieu.

GNS 133. PRACTICUM IN HUMAN SERVICE I. Lab. 3, cr. 1.

Directed in-service training in care settings.

GNS 134. HUMAN SERVICE. Class 3, cr. 3.

A comprehensive analysis of human service settings as complex social systems composed of personalities with a wide diversity of needs. Human management and control of the cared-for, stressing human relations skills and techniques, with an emphasis on specific therapeutic and recreational activties, their applicability to periods in the life cycle.

GNS 150. TEACHING SCIENCE AND MATHEMATICS IN THE ELEMENTARY SCHOOL I. Sem. 1. Class 3, cr. 3.

Part I of a two-part core course combining the teaching of science and the teaching of arithmetic in the elementary school curriculum. Included in the courses will be materials and methods used in teaching arithmetic at the various grade levels in the elementary school. In addition, experiences will be provided for the development of skills for teaching science and for the understanding of appropriate subject matter. Offered for paraprofessional training in education only.

GNS 151. TEACHING SCIENCE AND MATHEMATICS IN THE ELEMENTARY SCHOOL II. Sem. 2. Class 3, cr. 3.

Part II of a two-part core course combining the teaching of science and the teaching of arithmetic in the elementary school curriculum. Included in the courses will be materials and methods used in teaching arithmetic at the various grade levels in the elementary school. In addition, experiences will be provided for the development of skills for teaching science and for the understanding of appropriate subject matter. Offered for paraprofessional training in education only.

GNS 153. ALGEBRA AND GEOMETRY. Class 3, supervised tutoring 6, cr. 3.

An algebra and geometry class for stu-

dents who lack high school credit in algebra and geometry; students who have credit in algebra and geometry, but with grades lower than C; students with credit in algebra and geometry, but no recent mathematical experience.

GNS 154. ALGEBRA AND TRIGONOMETRY. Class 3, supervised tutoring 6, cr. 3. Prerequisite: two years of secondary school mathematics or satisfactory placement test score.

An algebra and trigonometry course for technology-oriented students who have not had three years of secondary school mathematics. Not open to students with credit in MA 147, 150, 151, 153.

GNS 160. INTRODUCTION TO GENERAL CHEMISTRY. Class 2, Lab. 3, cr. 3.

A survey of modern chemistry using everyday examples and contemporary experiments to illustrate the general theories and unifying concepts. The subject matter is so widely diversified that those desiring to continue will be prepared to successfully complete chemistry courses required for careers in health, agriculture, industry, energy, transportation, conservation, or other fields.

GNS 220. HUMAN DEVELOPMENT AND LEARNINGS I. Sem. 1. Class 3, cr. 3.

Part I of a two-part course combining educational psychology with case studies of elementary school children and directed observation in the elementary school. Included in the course will be an introduction to the applicants of psychological theories, research results, and methods of inquiry to educational problems, with particular emphasis on human development, learning, and measurement.

In addition, the methods of collecting information about the behavior and the development of children of elementary school age will be explored and experiences will be provided in using case studies in planning for individual children. Offered for paraprofessional training in education only.

GNS 221. HUMAN DEVELOPMENT AND LEARNINGS II. Sem. 2. Class 3, cr. 3.

Part II of a two-part course combining educational psychology with case studies of elementary school children and directed observation in the elementary school. Included in the course will be an introduction to the applicants of psychological theories, research results, and methods of inquiry to educational problems, with particular emphasis on human development, learning, and measurement.

In addition, the methods of collecting information about the behavior and the development of children of elementary school age will be explored and experiences will be provided in using case studies in planning for individual children. Offered for paraprofessional training in education only.

GNS 222. TRENDS AND ISSUES IN ELEMENTARY EDUCATION I. Sem. 1. Class 1, cr. 1.

Part I of a two-part seminar dealing with the organization of learning experiences to deal effectively with individual differences and varied curriculum patterns. Consideration of recent trends and research—programmed learning, team teaching, departmentalization, self-contained and ungraded classroom, core program, and use of special professional services. Offered for paraprofessional training in education only.

GNS 223. TRENDS AND ISSUES IN ELEMENTARY EDUCATION II. Sem. 2. Class 1, cr. 1.

Part II of a two-part seminar dealing with the organization of learning experiences to deal effectively with individual differences and varied curriculum patterns. Consideration of recent trends and research—programmed learning, team teaching, departmentalization, self-contained and ungraded classroom, core program, and use of special professional services. Offered for paraprofessional training in education only.

GNS 231. SEMINAR IN HUMAN SERVICE. Class 3, cr. 3.

An advanced overview of central care issues and problems, requiring students to identify, critically evaluate, and share their experiences in care settings synthesizing their in-service training and theoretical appreciation of human service.

GNS 232. TECHNIQUES OF HUMAN ASSESSMENT. Class 3, cr. 3.

A review, analysis and evaluation of the principles of motivation and learning, and the assessment techniques that are commonly used in human service settings, these include standard measurement procedures, participant observation methods, and case study techniques critical to the development of a sound care program.

GNS 233. PRACTICUM IN HUMAN SERVICE II. Lab. 3, cr. 1.

Directed in-service training in care settings.

GNS 235. CONTENT WORKSHOP: SEMINAR I. Class 1, Lab. 3, cr. 2.

Expressive/creative multimedia and music-movement-rhythms with on-site learning experiences that will demonstrate the use of a variety of activities designed to promote specific, developmentally determined facets of the child's physical, emotional, psychomotor, expressive, and social functioning.

GNS 236. CONTENT WORKSHOP: SEMINAR II.
Class 1, Lab. 3, cr. 2.
Continuation of GNS 235.

GNS 248. PRACTICUM IN EDUCATION. Cr. 1-3.
Field practice in elementary school classrooms under the supervision of University personnel and public school teachers. Offered for paraprofessional training in education only.

GNS 249. TOPICS IN EDUCATION. Cr. 1-3.
Offered for paraprofessional training in education only.

GNS 260. NUTRITION FOR HUMAN DEVELOPMENT
Class 2, Lab. 2, cr. 3.
Basic nutrition and its application in meeting nutritional needs as they change over the life span. Special considerations are given to food selection, legislation, and community nutrition educational programs.

GNS 290. TOPICS FOR STUDY.
Cr. 1-3.
Variable credit, variable title course for either group or individual study.

School of Humanities, Education and Social Sciences

A. D. Sander, Dean

The School of Humanities, Education and Social Sciences (HESS) educates for life in a changing world through studies and experiences which lead to an understanding of man, his history, literature, and art; his social, political and economic systems; and his relationship to the physical environment.

It provides a broad, liberal education and career preparation through courses in the humanities, education, and the social sciences for all members of the University, both in its own major's fields, and those in other schools and functions of the University.

DEGREES OFFERED

Three bachelor's degrees are offered in the School of Humanities, Education and Social Sciences; Bachelor of Arts, Bachelor of Science, and the Bachelor of Physical Education. The program leading to the degree Bachelor of Arts is followed by students majoring in any of the fields of the humanities or the social sciences, in high school teaching in any of these fields, and in elementary education. A program leading to the degree Bachelor of Science is offered to students majoring in psychology. The program leading to the degree Bachelor of Physical Education is followed by students preparing for coaching and teaching, for admission to a school of physical therapy, or for athletic training.

The plan of study for the Bachelor of Arts and the Bachelor of Science degrees consists of (1) the general education requirements; (2) the requirements for the major; and (3) a sufficient number of elective courses to bring the number of semester hour credits to 126. The general education requirements for the Bachelor of Physical Education are unique to that degree and the number of credits is 130. All credits must have been earned in the ten years preceding the date of graduation. When these requirements are met, with a grade average of C, the dean of the school will certify that the student has completed his plan of study.

GENERAL EDUCATION REQUIREMENTS (CORE)

The general education requirements specify a minimum involvement in several areas. They have been established in order to insure that each student has the opportunity to acquire skill in the oral and written use of his own language, in at least one other modern language, and in mathematics, and that he has had a significant experience in the sciences, the arts, the humanities, and in the social sciences.

AREAS	HOURS
English Composition (ENGL 104-105, or 103)	3 or 6
Interpersonal Communication (Speech) (COM 114)	3
Foreign Language (a modern language sequence, 101 through 204)	12
Mathematics (MA 121-122 or MA 153-154 or higher)	5 or 6
Freshman Issues (GS 101) (Must be taken while a Freshman)	3
Natural Science (A sequence in biology, geoscience, physics or chemistry)	6
Humanities (At least one course each from literature, history aesthetics, and philosophy)	15
Social Sciences (At least one course in economics or political science and one course in psychology, sociology or anthropology)	12
TOTAL	MAXIMUM 63
	MINIMUM 59

TRANSFER TO LAFAYETTE

The School's programs of study and courses are closely related to those of the School of Humanities, Social Science and Education at the Lafayette Campus. The Lafayette school is of course much larger and offers a wider selection of courses and majors, and since its basic mission is the same as that of HESS, it is relatively easy for students to transfer between the two schools. Many students begin their college studies at the Calumet Campus and then transfer to Lafayette to complete a major not offered here. Information about the Lafayette programs may be obtained from the office of the dean or from your academic advisor.

CONCENTRATION REQUIREMENTS

All students must complete a major of from 24 to 35 hours. Each department specifies whether its major must be accompanied by a minor. This major provides the depth necessary for admission to a graduate school, to meet teacher certification requirements, or for a well rounded education.

MAJORS

Communication
- Interpersonal and Public Communication
- Radio—Television

English
Foreign Language
- French
- German
- Spanish

History
- American History
- European History

Physical Education
Political Science
Psychology
Sociology

MINORS

Economics
English
French
German
History
Interpersonal and Public Communication
Mathematics
Media Sciences
Philosophy
Political Science
Psychology
Radio and Television
Sociology
Spanish

PROGRAMS FOR TEACHER CERTIFICATION
TEACHING MAJORS

Elementary Education
- Foreign Language
- Junior High School
- Kindergarten
- Library
- Physical Education

English
Foreign Language
- French
- German
- Spanish

Social Studies—two of:
- Economics
- Government
- Sociology
- U. S. History
- World History

Speech

TEACHING MINORS

Biology
Chemistry
English
Foreign Language
- French
- German
- Spanish

Mathematics
Physical Education
Physics
Psychology
Social Studies—one of:
- Economics
- Government
- Sociology
- U. S. History
- World History

Speech
School Library

Consult the departmental sections of this catalog and/or your academic adviser for specific requirements in these majors and minors.

In teacher preparation, Purdue University has been accredited by the National Commission on Accreditation of Teacher Education, by the North Central Association of Secondary Schools and Colleges, and by the Indiana State Department of Public Instruction. Detailed requirements for any of the areas, majors, or minors may be obtained from the student counseling office of the school. A student who has an educational objective not covered in the list of areas, majors, or minors should consult his academic adviser.

After 30 hours of college credit, a student pursuing programs for teacher certification should apply for admission to teacher education.

To be admitted to Teacher Education a student must:

1. Meet the minimum academic requirements
   a. 4.0 in English composition
   b. Minimum grade point index required in the major and minor
   c. Minimum graduation index required by the academic department
2. Pass a speech and hearing test
3. Be interviewed by an admissions board (*Elementary Education only*)

To facilitate completion of teacher certification requirements a student should enroll in ED 285 during his sophomore year.

A student must file his application for student teaching by February 1 of the year prior to the academic year in which he plans to do student teaching. Applications for student teaching will be accepted only from students who have been admitted to teacher education.

ADVISERS TO STUDENTS

One of the principal services to students in the School of Humanities, Education and Social Sciences is the corps of academic advisers. Each student has a conference with an adviser before he begins classes and thereafter at least once a semester. In general, a student discusses with his adviser the selection of courses for the following semester, the choice of a major, and vocational possibilities.

During his freshman year the student is assigned an adviser from the office of the dean. After he has chosen his major, the student is assigned to an adviser from the department of his major.

PASS/NOT PASS OPTION

In order to provide students with the opportunity to broaden their educational foundations with minimum concern for grades earned, an alternate grading system, the pass/not pass option has been established. Grades earned under this option are not used in computing grade indices. The School has established the following conditions for its students use of the Pass/Not Pass option:

1. Students must have a classification of three (3) or above and a graduation index of 4.0 or above to enroll in a course under the Pass/Not Pass option.
2. Students may elect the Pass/Not Pass grading option only in courses outside their departmental and HESS school requirements.

3. Students will indicate upon registering which courses are to be taken under the Pass/Not Pass option. Standard registration procedures such as the rules governing drop/add, withdrawal from courses, etc., will be followed.
4. HESS students may elect courses given in other schools of the University under the pass/not pass option.
5. A student who passes a course required by HESS under the pass/not pass option while enrolled in another school in the University is considered, upon transfer to HESS, to have met the HESS requirement.

ANTHROPOLOGY—See Department of Behavioral Sciences

ART AND DESIGN—See Department of Speech and Creative Arts

AUDIOLOGY—See Department of Speech and Creative Arts

DEPARTMENT OF BEHAVIORAL SCIENCES

Chester D. Clapp, Head

FACULTY: C. D. Clapp, A. A. Coolidge, V. C. Damusis, W. Hartmann, L. S. Mura, J. D. O'meara J. E. Prebis, D. Raden, R. E. Ray, T. D. Sherrard, P. H. Tress, V. L. Zolberg.

This interdisciplinary department focuses primarily on the study of people through a variety of perspectives: the B.A. degree in Psychology and the B.A. degree in Sociology are currently offered; some coursework and programming are now offered in anthropology, home economics, human development and social work; the department actively cooperates with the Community College's AA degree program in Human Services: Day Care—Child.

Psychology

Psychology is a science which deals with laws governing animal and human behavior. As such, it is valuable to persons in various disciplines and may also be of interest to individuals primarily interested in understanding human behavior. Psychology at the baccalaureate level offers a wide range of career opportunities in mental health clinics, hospitals, schools, industry, and government. Those students who wish to become professional psychologists should plan to spend three or four years in graduate work.

Minor

A minimum of 12 semester hours is required for a minor, not including PSY 120. All minors will take PSY 303. At least nine additional semester hours will come from courses approved by the student's adviser.

Major

A supporting minor need *not* be obtained with this major.

Prerequisites. For this major, students must establish credit in PSY 120. A six to eight hour biology sequence is recommended. This may be done by examination for credit, by including them in his choices in the HESS core, or by taking them as electives.

Requirements. A total of 30 semester hours distributed as follows:

1. A Psychology core of nine hours made up of PSY 301, 302, and 303.
2. An additional 21 hours made up of seven Psychology courses with no more than two courses in closely related areas.

Sociology

Sociology is the scientific study of man's social life. The increased complexities and problems in modern society have highlighted the importance and relevance of sociological knowledge and skills for many students. Sociology at the baccalaureate level offers varied career opportunities in social agencies, government, business and industry. Those students who wish to become professional sociologists should plan to spend three or four years in graduate work. Students interested in social work should include SOC 361, 462, 531, 562, 591G in their course work.

Minor

For this minor the student must establish credit in SOC 100 and 220 and complete 12 additional credits in sociology courses numbered 300 or higher.

Major

A supporting minor must be obtained with this major. Credit must be established in SOC 100 and 220. The 24 hours needed for the major include (1) 15 required hours i.e., ANTH 105, SOC 340, 382, 383, 402; (2) nine elective hours in any other sociology courses provided six of these hours are in 400-500 level courses.

Home Economics

See School of Home Economics under Transfer Programs.

Human Services (AA Degree)

See Community College.

Anthropology

UNDERGRADUATE LEVEL

ANTH 105. AN INTRODUCTION TO CULTURAL ANTHROPOLOGY. SS. Class 3, cr. 3.

An introduction to the science of man and his works. Emphasis on the nature of culture and culture change; relationship of culture and personality. Attention given to the variations with the "universal" institutions of man: language, technology, the family, systems of social control, economics, warfare, religion, art, and values. Processes of invention, diffusion and acculturation; theoretical interpretations of the direction and process of cultural development.

ANTH 304. PREHISTORIC MAN. Sem. 1 and 2. Class 3, cr. 3.

An introduction to the physical evolution of man and the nature of early culture and society. Man's relationship to the other primates; fossil evidence of early human types. Attention is given to the archaeological remains of the prehistoric cultures of the paleolithic, mesolithic, and neolithic periods.

ANTH 341. CULTURE AND PERSONALITY. Class 3, cr. 3. (Same as SOC 341.) Prerequisite: three hours of anthropology, sociology, child development, or psychology, or equivalent.

A cross-cultural survey stressing differing basic personality types and the processes by which adult personality is acquired. Case studies of selected non-western cultures will be used to provide comparative perspective.

ANTH 404. COMPARATIVE SOCIAL ORGANIZATION. Class 3, cr. 3. Prerequisites: nine hours of sociology or anthropology.

This course uses an anthropological, cross-cultural perspective in comparing and analyzing types of social organization. Kinship terminologies and systems, residence units, voluntary groupings, and features of stratification will be compared. Emphasis will be placed upon primitive band, tribal, and chiefdom societies with some focus upon more complex forms of organization.

ANTH 414. INTRODUCTION TO LANGUAGE AND CULTURE. Class 3, cr. 3. Prerequisite: ANTH 105 or equivalent.

This course introduces undergraduate students to the anthropological view of language. Communication systems of other animals will be discussed to highlight the importance of language in the development of culture. Various theories of language and the diversity of language will be investigated. The anthropologist's view of language structure, linguistic change, and writing systems will be presented. There will be a strong emphasis on the relation of language to other aspects of culture. Non-Indo-European languages will be compared to American English throughout the course.

ANTH 425. ANTHROPOLOGICAL ARCHEOLOGY. Class 3, cr. 3. Prerequisite: ANTH 105 and 304, or consent of instructor.

Introduction to the theory and methods of modern American archeology. Basic field and laboratory methods are placed in the context of theoretical viewpoints and problems. Major theoretical issues in the field are explored, showing the integration of American archeology with anthropology.

DUAL LEVEL
Undergraduate-Graduate

ANTH 505. CULTURE AND SOCIETY. Class 3, cr. 3. Prerequisite: three hours of anthropology or sociology.

An introduction to cultural anthropology for the advanced student. A review is made of the history of anthropology and its place in the social sciences. Emphasis is placed on problem formulation and methodology in the study of culture change.

ANTH 507. SOCIAL ANTHROPOLOGY. Class 3, cr. 3. Prerequisite: ANTH 105 or equivalent, or consent of instructor.

Intensive training in the methods and theories of social anthropology. Special attention is given to structural and functional approaches to the gathering and understanding of data drawn from non-western societies and cultures. Particular emphasis is placed on the contributions of social anthropology to the study of kinship, economics, politics, and community social structures.

ANTH 514. ANTHROPOLOGICAL LINGUISTICS. Class 3, cr. 3. Prerequisite: ANTH 105 or equivalent, or consent of instructor.

An introduction to the anthropological view of linguistics and the ways in which anthropologists use linguistics as a research tool. The emphasis will be on structural and historical linguistics, but other approaches to the study of language will be considered.

ANTH 541. PSYCHOLOGICAL ANTHROPOLOGY. Class 3, cr. 3. Prerequisite: ANTH 105 or equivalent, or consent of instructor.

Exploration of current work being done in the culture-and-personality field of anthropology. Considerable attention will be given to various kinds of field procedures for eliciting personality data cross-culturally. A major portion of the course will be devoted to examining and evaluating the status of existing theories in this field of anthropological interests.

ANTH 590. INDIVIDUAL RESEARCH PROBLEMS. SS. Cr. 1-3. Prerequisite: consent of instructor. (May be repeated for credit.)

Individual research or reading in an area of anthropology under an anthropologist staff member. Does not include thesis work.

Psychology

UNDERGRADUATE LEVEL

PSY 120. ELEMENTARY PSYCHOLOGY. Class 3, cr. 3.

Introduction to the fundamental principles of psychology, covering particularly the topics of personality, intelligence,

emotion, attention, perception, learning, memory, and thinking.

PSY 235. CHILD PSYCHOLOGY. Class 3, cr. 3. Prerequisite: PSY 120 or equivalent.

General principles of children's behavior and development, from conception to adolescence, including sensory and motor development, and basic psychological processes such as learning, motivation, and socialization.

PSY 301. INTRODUCTION TO STATISTICS. Class 3, cr. 3. Prerequisites: PSY 120 and MA 213.

Introduction to basic statistical concepts including such descriptive statistics as averages, measure of variability, and correlation, as well as an introduction to inferential statistics.

PSY 302. PSYCHOLOGICAL MEASUREMENT. Class 3, cr. 3. Prerequisite: PSY 301.

Introduction to the general theory and method of psychological measurement including psychophysics, scaling procedures, and the use of psychological tests as measuring devices.

PSY 303. EXPERIMENTAL PSYCHOLOGY. Class 2, Lab. 2, cr. 3. Prerequisite: PSY 301 or equivalent.

The lecture portion of this course covers methodology and the philosophy of science, while the laboratory experience covers different techniques in several areas of experimental psychology.

PSY 310. SENSORY AND PERCEPTUAL PROCESSES. Class 3, cr. 3. Prerequisite: MA 151 or 153 or equivalent.

Theory, problems, and research in sensation and perception, including, physiological bases and measurement techniques.

PSY 311. HUMAN LEARNING AND MEMORY. Class 3, cr. 3. Prerequisite: six hours of psychology.

History, theory, and research in motivation and learning.

PSY 312. RESEARCH IN EXPERIMENTAL PSYCHOLOGY. Lab. 6, cr. 3. Should be taken concurrently with PSY 310 or 311. Prerequisite: consent of instructor. (May be repeated for credit.)

Advanced laboratory work in experimental psychology.

PSY 313. RESEARCH IN HUMAN LEARNING AND MEMORY. Class 1, Lab. 4, cr. 3. Prerequisite: six hours of psychology; corequisite: PSY 314.

An intensive examination of modern approaches to learning theory. Current animal data are discussed in depth in relation to modern learning theories. A course for the serious student who plans to use learning theory in future work.

PSY 329. PHYSIOLOGICAL PSYCHOLOGY II: PRINCIPLES OF PHYSIOLOGICAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: six hours of psychology.

The relationship of physiological information and basic anatomy, with special emphasis on the central nervous system, to variables fundamental to the study of psychology.

PSY 340. GENERAL SOCIAL PSYCHOLOGY. Class 3, cr. 3. (Not open to students with credit for SOC 340.) Prerequisite: three hours of psychology or of sociology.

Conditions and consequences of human behavior in social situations, with emphasis upon the mechanism and the processes on the basis of which socialization takes place.

PSY 341. RESEARCH IN SOCIAL PSYCHOLOGY. Class 1, Lab. 4, cr. 3. Prerequisites: PSY 301 and 340 (the latter may be taken concurrently).

Research techniques and laboratory work in social psychology.

PSY 346. EXPERIMENTAL SOCIAL PSYCHOLOGY. Class 3, cr. 3. Prerequisites: PSY 301 and 340.

An in-depth survey of selected topics in social psychology, focusing on recent experimental findings and theoretical developments.

PSY 348. GROUP AND HUMAN RELATIONS. Class 3, cr. 3. Prerequisite: six hours of psychology.

A concrete introduction to the psychology of personality, the structure and dynamics of small groups, and the formation and development of group cultures. Members constitute themselves into a self-analytic group which analyzes its own processes in relation to the personalities and roles of its members.

PSY 350. ABNORMAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: three hours of psychology.

Various forms of mental disorder from the standpoint of their origin, treatment, prevention, social significance, and relation to problems of normal human adjustment.

PSY 423. PSYCHOLOGY AND PERSONALITY. Class 3, cr. 3. Prerequisite: three hours of psychology.

The development, structure, and functioning of the normal personality.

PSY 424. PERSONALITY RESEARCH. Class 2, Lab. 2, cr. 3. Prerequisite: PSY 301 or equivalent.

An introduction to research techniques in personality including review and evaluation of published personality research.

PSY 425. PERSONALITY SEMINAR. Class 3, cr. 3. (May be repeated for credit.) Prerequisite: permission of instructor.

Seminar course for undergraduate students, providing coverage in depth of topics in or related to personality research or personality theory, specific topic to vary from semester to semester.

PSY 433. ISSUES IN DEVELOPMENTAL PSYCHOLOGY. Class 3, cr. 3. (Formerly PSY 533.) Prerequisite: six hours of psychology.

A survey of current major issues of developmental psychology and relevant and evolving methodological approaches to these problems. The emphasis is on developmental processes and factors affecting these processes.

PSY 441. INDEPENDENT RESEARCH IN SOCIAL-PERSONALITY PSYCHOLOGY. Cr. 3. (May be repeated for credit.)

Arranged with the consent of a faculty member in the area of social-personality psychology. The student works with an individual faculty member in the planning, conducting, and analysis of a research project.

PSY 493. INTERDISCIPLINARY UNDERGRADUATE SEMINAR. Class 1-3, cr. 1-3. (Same as HIST 493, PHIL 493, POL 493, and SOC 493.) Prerequisite: consent of instructor. (May be repeated for credit.)

An undergraduate seminar devoted to an interdisciplinary examination of social, economic, political, and intellectual movements, using the faculty resources of the participating departments. Subject matter will vary. Each offering of the seminar will be approved by a committee of department heads from the sponsoring departments.

PSY 498. SENIOR RESEARCH. Cr. 3. (May be repeated for credit.)

Open to senior undergraduate majors in psychology. Student conducts and writes up an individual research project under the guidance of a member of the staff.

DUAL LEVEL
Undergraduate-Graduate

PSY 500. STATISTICAL METHODS APPLIED TO PSYCHOLOGY, EDUCATION, AND SOCIOLOGY. Class 3, cr. 3.

Descriptive statistics and an introduction to sampling statistics. Applied to psychological, sociological, and educational data.

PSY 505. MENTAL MEASUREMENT. Class 2, Lab. 2, cr. 3. Must be preceded by six hours of psychology, including PSY 500 or equivalent.

Introduction to the general area of mental measurement. Theory and content of measuring devices in the fields of intelligence, interests, personality, and special aptitudes.

PSY 523. INTRODUCTION TO THEORIES OF PSYCHOTHERAPY. Class 3, cr. 3. Prerequisite: introductory course in theory of personality advisable, especially for undergraduates (e.g., PSY 423).

A survey of the major approaches to psychotherapy, including their theory of illness and cure. Three traditions are represented: psychoanalytical (e.g., Freud, Adler, Jung), behavioral (e.g., Miller and Dollard, Wolpe, Stampfl), and cognitive-phenomenological (e.g., Rogers, Kelly, Perls).

PSY 532. PSYCHOLOGY OF THE EXCEPTIONAL CHILD. Class 3, cr. 3. Prerequisite: six hours of psychology.

Principles of diagnostic testing, adaptive teaching, and guidance applied to the improvement of teaching and to the correction of learning difficulties of exceptional children.

PSY 550. INTRODUCTION TO CLINICAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: 12 hours of psychology.

The case-study method, including a discussion of the importance of historical information, the contribution of clinical tests to diagnosis, and a general survey of prevention and treatment techniques.

PSY 570. INDUSTRIAL PSYCHOLOGY. Class 3, cr. 3.

Survey of the applications of psychological principles and of research methodology to the various human problems

in industry, such as: personnel selection and appraisal; the organizational and social context of human work; the job and work situation; human errors and accidents; and psychological aspects of consumer behavior.

PSY 572. ORGANIZATION PSYCHOLOGY. Class 3, cr. 3.

A survey of basic behavioral science research and thinking as these contribute to the understanding of individual, didatic, group, intergroup and other large organization behavioral phenomena. The topics covered include motivation, perception, attitudes and morale, communication, leadership, conflict, problem solving, behavior change, and organizational effectiveness.

PSY 577. HUMAN FACTORS IN ENGINEERING. Class 3, cr. 3. Primarily for engineers and other nonpsychology majors.

Survey of human factors in engineering with particular reference to human functions in man-machine systems, and consideration of human abilities and limitations in relation to design of equipment and work environments.

PSY 579. HUMAN FACTORS LABORATORY. Class 2, Lab. 3, cr. 3.

Laboratory experience in carrying out and writing up experiments in aspects of human performance that are relevant to human factors engineering, including sensory and psychomotor processes, information processing, and decision analysis. In addition, each student will have the opportunity to develop and carry out an experiment of his own choosing.

PSY 585. PSYCHOLOGICAL FOUNDATIONS OF CONSUMER BEHAVIOR. Class 3, cr. 3. Prerequisite: three hours of psychology.

A survey of the concepts and methods of psychology as they apply to the study of consumer behavior.

PSY 590. INDIVIDUAL RESEARCH PROBLEM. Cr. 1-6. Prerequisite: 12 hours of psychology. Admission by consent of instructor.

Opportunity for students to study particular problems in any field of psychology or initiate themselves into research techniques under the guidance of a member of the staff.

Sociology

UNDERGRADUATE LEVEL

SOC 100. INTRODUCTORY SOCIOLOGY. Class 3, cr. 3.

A survey course designed to introduce the student to the science of human society. Fundamental concepts, description, and analysis of society, culture, the socialization process, social institutions, and social change. A first course for sociology majors and a possible terminal course for nonmajors.

SOC 220. SOCIAL PROBLEMS. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Contemporary problems at the community, society, and international levels, focusing on patterns of social organization and social change in American society, with concentration on such topics as technological militarism and war, poverty, racism, political protest, and cybernation.

SOC 334. URBAN SOCIOLOGY. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Development of the city and its functions: types of social behavior in cities; influences of city life on personality; city planning.

SOC 340. GENERAL SOCIAL PSYCHOLOGY. Class 3, cr. 3. (Not open to students with credit for PSY 340.) Prerequisite: three hours of psychology or of sociology.

Social influences on the individual and processes of social interaction. Individual attitudes and behavior as related to socialization, social norms, social roles, communication and propaganda, and other social influences. Among the interaction processes considered are interpersonal attraction, influence, leadership, cooperation, and conflict.

SOC 350. SOCIAL PSYCHOLOGY OF MARRIAGE. Class 3, cr. 3. Prerequisite: SOC 100 or 312, or equivalent. (Not open to students who have had CDFL 350.)

Designed to provide an understanding of contemporary courtship, marriage, and family interaction as cultural, social, and

social-psychological phenomena. Consideration of the major sources of marital strain and conflict within a heterogeneous, rapidly changing society.

SOC 361. THE FIELD OF SOCIAL WORK. Class 3, cr. 3. Prerequisite: SOC 100 or 312 or equivalent.

Basic concepts and activities of social service organizations. Field trips to selected institutions.

SOC 382. INTRODUCTION TO METHODS OF SOCIAL RESEARCH I. Class 3, cr. 3. Prerequisite: six hours of sociology.

Introduction to the basic techniques of statistical analysis applicable to sociological data. Elementary descriptive statistics and statistical inference. Introduction to multivariate analysis.

SOC 383. INTRODUCTION TO METHODS OF SOCIAL RESEARCH II. Class 3, cr. 3. Prerequisite: SOC 382.

Introduction to the methods of data collection and analysis and to the use of the scientific method in social research.

Formulation of hypotheses and research designs for their testing. Elementary principles for the conduct of experiments, observation, and interviewing, documentation; content analysis; and surveys. Relationship between social research and social theory.

SOC 402. PRINCIPLES OF SOCIOLOGY. Class 3, cr. 3. Prerequisite: nine hours of sociology.

An advanced critical treatment of the theories, concepts, and methods of sociology. A basic course required of undergraduate majors in sociology.

SOC 411. SOCIAL STRATIFICATION. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Examination of systems of class and caste, with special attention to the United States; status, occupation, income, and other elements in stratification.

SOC 421. JUVENILE DELINQUENCY. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

A study of social and psychological factors influencing individual delinquent behavior patterns. Emphasis on preventive and rehabilitative programs and the role of community agencies, such as social service agencies, juvenile courts, youth authorities. Visits to selected organizations and institutions.

SOC 422. CRIMINOLOGY. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Nature and cause of crime; methods of dealing with adult and juvenile offenders; consideration of present programs for the social treatment of crime in the light of needed changes.

SOC 462. FIELD EXPERIENCE IN SOCIAL WELFARE. Class 1, Lab. 6, cr. 4.

Observation and supervised participation in local social welfare agencies. Readings and class meetings to integrate theory and experience. Intended for students who wish to enter graduate school of social work or who plan to become employed in a public welfare agency upon receiving the bachelor's degree.

SOC 493. INTERDISCIPLINARY UNDERGRADUATE SEMINAR. Class 1-3, cr. 1-3. (Same as HIST 493, PHIL 493, POL 493, and PSY 493.) Prerequisite: consent of instructor. (May be repeated for credit.)

An undergraduate seminar devoted to an interdisciplinary examination of social, economic, political, and intellectual movements, using the faculty resources of the participating departments. Subject matter will vary. Each offering of the seminar will be approved by a committee of department heads from the sponsoring departments.

DUAL LEVEL
Undergraduate-Graduate

SOC 514. RACIAL AND CULTURAL MINORITIES. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

America's minority groups; immigration; interracial and intercultural conflicts; assimilation.

SOC 515. BLACK AMERICANS. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

The status of Blacks in contemporary American society in the context of dominant-minority group relations. Current attitudes and ideological orientations; education and school desegregation; housing and residential segregation; the Black family; the socio-economic status of Blacks; civil rights groups and their approaches to inequality; and prospects for the future.

SOC 525. SOCIAL MOVEMENTS. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Origins and developmental stages of revolutionary and reform movements and communitarian societies; relation between social structure and political attitudes; personality needs and affinity for social and political ideologies.

SOC 530. POLITICAL SOCIOLOGY. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Analysis of social bases of power and of political institutions; the organization or power in preliterate and modern societies; voting behavior and interest groups; political bureaucracy, political movements, and social change.

SOC 531. COMMUNITY ORGANIZATION. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Analysis of the local community in terms of its institutional structure, relationships among institutions, political and economic power relationships, and the role of voluntary organizations and interest groups.

SOC 541. THE ANALYSIS OF SMALL GROUPS. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Examines the internal dynamics of small groups and their relationship to the individual and larger social structures. Examines the functions of the small group; social cohesion and differentiation, emergence of social norms and social control; and the structure of small groups.

SOC 542. INTERGROUP RELATIONS. Class 3, cr. 3. Prerequisite: three hours of sociology or psychology.

The determinants of conflict vs. coisolations vs. contact in the relations between social groups. Relations between racial, religious, national, and other groups are studied to identify general processes common to intergroup relations as well as processes unique to certain settings.

SOC 550. GENDER IDENTITY AND SEX ROLE DIFFERENTIATION. Class 3, cr. 3. Prerequisite: SOC 350 or 450, or consent of instructor.

Psychosexual differentiation, both prenatal and postnatal; normal and deviant processes involved in establishing gender identity and in functioning within a sex role setting. Some attention to hermaphroditism, transsexualism, and homosexuality. The masculinity-femininity dimension of personality; sex role structures and sex role learning within a societal context. A companion course to SOC 450.

SOC 562. PUBLIC SOCIAL SERVICES. Class 3, cr. 3. Prerequisites: SOC 100, 312, or equivalent.

Activities and responsibilities of governmental agencies in meeting social needs. Emphasis on changing philosophies and changing social values, together with their implementation into these services.

SOC 570. SOCIOLOGY OF EDUCATION. Class 3, cr. 3. Prerequisite: SOC 100 or equivalent.

Analysis of the American public school as a social organization. Includes: interrelations among community power structure, social stratification, and the school; the roles of superintendent, principal, and teacher in community and school; the classroom as a social system; student culture; and teaching as a profession.

SOC 572. RELIGION IN AMERICAN SOCIETY. Class 3, cr. 3. Prerequisite: SOC 100, 312 or consent of instructor.

Examination of organized religion in America, including beliefs and practices of major American faiths, inter-faith images, dimensions and consequences of religious involvement, types of church structure, churches as community organizations, inter-group conflict, and types of ecumenical activity.

SOC 590. INDIVIDUAL RESEARCH PROBLEMS. Cr. 1-3. Prerequisite: consent of instructor. (May be repeated for credit.)

Individual research or reading in an area of sociology under a sociology department staff member. Does not include thesis work.

SOC 591. SELECTED TOPICS IN SOCIOLOGY. Cr. 1-3. Prerequisite: SOC 100 or equivalent. (May be repeated for a maximum of six credit hours.)

CHILD AND FAMILY DEVELOPMENT—See School of Home Economics

CLOTHING AND TEXTILES—See School of Home Economics

COMMUNICATION—See Department of Speech and Creative Arts

DRIVER EDUCATION—See Department of Education

DEPARTMENT OF EDUCATION

S. D. Paravonian, Head

FACULTY: L. M. Crawford, J. E. Davis, D. J. Delph, W. V. Giddings, K. E. Griswold, V. Jacobson, D. E. Johnson, J. B. Keiter, C. W. Miller, J. W. Mybeck, J. A. O'Shields, S. D. Paravonian, E. E. Reed, R. H. Rivers, W. H. Smead, C. Trimble, E. L. Vockell, E. H. Vondran, W. R. Wright.

PHYSICAL EDUCATION: R. C. Hayes, R. M. Johnson, G. H. Rosenau.

The Department of Education provides preparatory and developmental programs for various educators such as elementary and secondary school teachers, school administrators, librarians, educational media specialists, and counselors. Each program includes an integrated sequence of didactic and experiential activities. Emphasis is placed on developing professional competencies as well as skills in interpersonal relationships.

The curriculum enables students to fulfill the requirements in accordance with state regulations for a provisional certificate in either elementary or secondary education. All courses necessary in many teaching fields may be taken at the Calumet Campus and others may be completed in conjunction with the West Lafayette Campus.

General education forms a significant segment of the teacher education program followed by in-depth study in given subject matters areas. The entire program is enhanced by professional education courses culminating in a supervised teaching experience in the public schools in the area.

The Bachelor of Physical Education degree is offered through this department. Students can also earn teacher certification in the areas of Physical Education and Health and Driver Education. Included in this program are preparatory courses for coaching of interscholastic athletic teams.

The course of study is designed to provide the student with a background in many areas of individual and team activities, science, health and safety, driver education, and teaching methods in preparation for becoming physical education teachers from kindergarten through high school.

Courses are also offered for students who wish to develop skills in such activities as golf, bowling, tennis, swimming, physical fitness, handball and table tennis.

Placement services are available to assist students in finding teaching positions which are commensurate with their interests and training.

Graduate programs leading to the Masters of Science degree in Education are offered in a number of areas (see page 36). These are designed to meet state requirements for professionalization of a teaching certificate as well as to broaden and strengthen the student's background in academic areas. Master's degree programs are individually planned in keeping with the student's certification requirements and professional interests. National Council for the Accreditation of Teacher Education (NCATE) accreditation assures students of the likelihood of reciprocal acceptance of certification in other states.

Graduate programs in the Department of Education completely available at the Calumet Campus are described in the Graduate Study Section (page 36).

Elementary Education Major

The Elementary Education major can be combined with a second major, teaching endorsement, or directed electives.

A. Department requirements: the following 35 semester hours in Education —Ed 249, 285, 320, 321, 326, 385, 327, 322, 323, 430, 480.
B. Requirements of the School of Humanities, Education and Social Science: 53-57 semester hours in general education courses. See page 175.
C. Selected courses in General Education to meet state certification requirements. (See advisor)
D. University requirements: sufficient elective courses to bring the total credits to 126.

School Library and Audio-Visual Services Minor

This minor can be combined with any major.

Requirements: 24-25 hours.

Ed 570, 581, 571, 582, 583, 584, 578, plus 4 credit hours selected from Ed 478, 579, or 580.

Physical Education Major

The Physical Education teaching-coaching option can be combined with any minor and provides teacher certification from kindergarten through senior high school.

A. Physical Education major requirements: 40 semester hours.
   1. The following courses in Physical Education: PEMN 103, 104, 105, 1 credit hour from 153, 154, 155 or 156, 204, 205, 206, 302, 307, 309, 314, 316, 404, 405, 406, 474.
   2. The following courses in Health and Safety: H&S 219, 280, 319.
   3. The following course in Recreation: Recr 301.
   4. The following courses in Biology: Biol 203, 204.
B. Requirements for teacher certification:
   1. Education 285, 304, 414, 419, 424, 485—20-22 hours (2 hours of teaching methods in minor area).
   2. Mathematics and Science—18 hours.
   3. Social Science—15 hours (including Psychology 120).
C. Requirements of the School of Humanities, Education and Social Sciences: 53-60 semester hours in general education courses largely met by the requirements in A and B.
D. University requirements: sufficient elective course to bring the total credit to 130.

Physical Education Minor

The Physical Education minor can be combined with most majors.

Requirements:

1. Biology 203, 204.
2. Fourteen (14) semester hours from the following: PEMN 103, 104, 153, 154, 155, 156, 158, 204, 205, 206, 307*, 309*, 314, 316*.
3. Four (4) semester hours from the following: H&S 280, PEMN 105, 302, 404, 405, 406, 474.

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* Only two semester hours of these courses may be applied to the 24 hour minor.

EDUCATION

UNDERGRADUATE LEVEL

ED 231. INTROOUCTION TO SPECIAL EDUCATION. Class 3, cr. 3. Prerequisite: PSY 120 or equivalent.

A survey of the field of special education; consideration of the kinds of children served, why they need special help, and how it can be provided.

ED 249. DIRECTED OBSERVATION IN SCHOOLS. Lab. 3, cr. 1.

Directed observation for one-half day per week in classrooms. Individual and group conferences and written records are required. (Offered at the Calumet Campus with the pass/not pass option.)

EO 285. EDUCATIONAL PSYCHOLOGY.* Class 3, cr. 3. Prerequisite: PSY 120.

An introduction to the application of psychological theories, research results, and methods of inquiry to educational problems, with particular emphasis on human development, learning, and measurement.

EO 304. PRINCIPLES OF TEACHING.* Class 2, cr. 2. Prerequisite: PSY 120.

Fundamental principles underlying classroom instruction and management, including consideration of pupil behavior, counseling and remedial techniques.

EO 320. TEACHING THE LANGUAGE ARTS IN THE ELEMENTARY SCHOOL.* Class 3, cr. 3.

Materials and methods of teaching oral and written language, listening, spelling, and handwriting in the elementary school.

EO 321. TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL.* Class 3, cr. 3. Prerequisites: MA 130, 131, 132, ED 249, 285.

Materials and methods used in teaching mathematics at various grade levels in the elementary school.

EO 322. TEACHING SOCIAL STUOIES IN THE ELEMENTARY SCHOOL.* Class 3, cr. 3.

Curriculum principles and objectives, organization of materials, instruction techniques, and evaluation procedures.

ED 323. TEACHING OF SCIENCE IN THE ELEMENTARY SCHOOL CURRICULUM.* Class 3, cr. 3.

Provides experiences in developing skills for teaching science as well as the understanding of appropriate subject matter; includes evaluation techniques and procedures.

ED 324. MUSIC FOR ELEMENTARY SCHOOL TEACHERS.* Class 3, cr. 3.

Basic musical experience, including elementary music skills. Principles and procedures of teaching music. Relationship of music to other subject areas. Music materials.

ED 325. THE TEACHING OF MODERN FOREIGN LANGUAGES IN THE ELEMENTARY SCHOOLS.* Class 2, Lab. 3, cr. 3. Should precede the professional semester.

Lectures and discussions on the place of modern foreign languages in the elementary school curriculum and on current methods and materials for teaching modern foreign languages at this level; workshop activities for the development of teaching skills.

ED 326. TEACHING REAOING IN THE ELEMENTARY SCHOOL.* Class 3, cr. 3.

Methods and materials for teaching reading in the elementary school.

EO 327. CORRECTIVE REAOING FOR THE CLASSROOM TEACHER.* Class 2, Lab. 3, cr. 3. Prerequisites: ED 285, 326, and 385.

Classroom procedures for the identification of reading difficulties; selection and application of appropriate methods and materials to provide corrective treatment.

ED 385. CASE STUDIES OF ELEMENTARY SCHOOL CHILOREN.* Cr. 2. Prerequisite: ED 285 or consent of instructor.

Presents methods of collecting information about the behavior and development of elementary-age children and provides experience in using case studies in planning for individual children.

Methods of Teaching Secondary School Subjects

The separate courses (402 to 419) are prescribed for students seeking secondary school licenses in the respective subjects. They deal with materials, methods, and literature relating to the teaching of the subjects in which the student is seeking a license.

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* No undergraduate student may be enrolled in any of these undergraduate courses until he has been admitted to teacher education and has a copy of his acceptance on file with his adviser.

ED 402. THE TEACHING OF BIOLOGY IN SECONOARY SCHOOLS.* Class 2, cr. 2. Prerequisite: ED 285.

ED 404. THE TEACHING OF CHEMISTRY IN SECONDARY SCHOOLS.* Class 1, Lab. 2, cr. 2. Prerequisite: ED 285; ED 304 for majors only.

ED 405. THE TEACHING OF ENGLISH IN SECONOARY SCHOOLS.* Class 2, cr. 2.

EO 406. THE TEACHING OF SOCIAL STUOIES IN SECONDARY SCHOOLS.* Class 2, cr. 2.

EO 408. THE TEACHING OF MATHEMATICS IN SECONDARY SCHOOLS.* Class 2, cr. 2. Prerequisite: ED 285; ED 304 for majors only.

EO 410. THE TEACHING OF MOOERN FOREIGN LANGUAGES.* Class 3, cr. 3.

EO 412. THE TEACHING OF PHYSICS IN SECONOARY SCHOOLS.* Class 1, Lab. 2, cr. 2. Prerequisite: ED 285; ED 304 for majors only.

ED 414. THE TEACHING OF PHYSICAL EDUCATION FOR MEN IN SECONOARY SCHOOLS.* Class 2, cr. 2.

EO 418. THE TEACHING OF SPEECH IN SECONDARY SCHOOLS.* Class 2, cr. 2.

EO 419. THE TEACHING OF HEALTH AND SAFETY.* Class 2, cr. 2.

The selection and application of teaching methods, materials and content, and resources appropriate for health instruction at the various educational levels.

EO 424. SUPERVISED TEACHING OF SECONOARY SCHOOL SUBJECTS.* Cr. 6 or 8. Prerequisite or corequisite: a methods course.

Observation and teaching of some academic subject or physical education in secondary schools under the supervision of the critic teachers in charge of the high school classes and supervisors from the University.

EO 430. SUPERVISEO TEACHING IN THE ELEMENTARY SCHOOL.* Cr. 8.

Teaching full-time in elementary school classrooms under the supervision of the elementary education staff and public school teachers. Emphasis on preparation and presentation of major teaching units and full classroom responsibility.

EO 478. INTRODUCTION TO LIBRARIES ANO MEDIA CENTERS.* Class 2, cr. 2.

A survey of the broad field of librarianship including the development and function of libraries with emphasis on the school library as a media center.

EO 480. SOCIAL AND PHILOSOPHICAL FOUNOATIONS OF EDUCATION.* Class 3, cr. 3.

Introduction to the social forces and philosophical ideas which surround education, including community structure, American ideals and conflicts in relation to the schools, comparison of contemporary communications and their schools, and the interaction between education and social progress.

ED 481. TRENOS AND ISSUES IN ELEMENTARY EOUCATION.* Class 3, cr. 3.

The organization of learning experiences to deal effectively with individual differences and varied curriculum patterns. Consideration of recent trends and research—programmed learning, team teaching, departmentalization, self-contained and ungraded classroom, core program, and use of special professional services.

ED 485. THE AMERICAN SCHOOL SYSTEM.* Class 3, cr. 3.

An introduction to contemporary education in this nation with particular emphasis on the organization, administration, and operation of public schools in respect to purposes, programs, problems, and trends.

DUAL LEVEL
Undergraduate-Graduate

ED 500. HISTORY AND PHILOSOPHY OF EOUCATION. Class 3, cr. 3. (Can be repeated for credit.)

Consideration of the major ideas, trends, and movements in the development of education. This course will be taught under three separate topics as follows: (1) history of western education, (2) history of American education, and (3) philosophy of American education. Students may enroll for more than one section.

EO 510. INTROOUCTION TO GUIOANCE. Class 3, cr. 3. Must be preceded by 12 hours of psychology and education or equivalent professional training.

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* No undergraduate student may be enrolled in any of these undergraduate courses until he has been admitted to teacher education and has a copy of his acceptance on file with his adviser.

Treats the history, principles, services, and theoretical development of guidance with consideration given to counselor role and functions, current practices, and emerging trends and issues.

ED 511. GUIDANCE IN THE ELEMENTARY SCHOOL. Class 3, cr. 3. Must be preceded by 12 hours of education and psychology.

Guidance problems arising in the elementary school, and principles and techniques applicable to their solution. Role of the classroom teacher in providing services to pupils and parents.

ED 512. CAREER THEORY AND INFORMATION. Class 3, cr. 3.

Treats career development theories which emphasize aspects of the self in decision-making, occupational classification systems, and educational and vocational information with applications to individual and group counseling.

ED 520. FOUNDATIONS FOR REMEDIAL READING. Class 3, cr. 3. Prerequisites: 12 hours of education and psychology.

First course in sequence leading to certification as a reading specialist, but may be elected by others needing basic information in reading. Considers history, psychology and physiology, and current practices in developmental and remedial reading.

ED 521. DIAGNOSIS AND TREATMENT OF READING DISABILITIES. Class 2, Lab. 3, cr. 3. Prerequisite: ED 520.

Focuses on diagnostic instruments and procedures for identification and remediation of reading disabilities and associated learning, language, or behavioral disorders. Designing specific remedial programs is also emphasized.

ED 522. READING IN MIDDLE AND SECONDARY SCHOOLS. Class 3, cr. 3.

A course designed for teachers and prospective teachers in subject matter areas of the junior and senior high school. May be taken as part of the sequence leading to Reading Specialist or for the Junior High School endorsement program. Surveys of techniques and objectives of reading instruction in the schools with special attention to the opportunities and obligations to teach reading within content areas. Teaching experience helpful but not required.

ED 523. INTRODUCTION TO MEASUREMENT AND EVALUATION. Class 2, Lab. 2, cr. 3.

An introduction to the basic concepts and principles of measurement and evaluation with special emphasis on descriptive statistics, and teacher made and standardized tests.

ED 524. MEASURING EDUCATIONAL ACHIEVEMENT. Class 3, cr. 3.

A course in test construction. The primary objective is to help students to develop the facility to write behavioral objectives and test items to measure the objectives. The course is designed to help the student learn to write test items that deal not only with the relevant content but also with the process involved.

ED 525. INTRODUCTION TO EDUCATIONAL RESEARCH I: METHODOLOGY. Class 3, cr. 3. Must be preceded by PSY 120 or consent of instructor.

An introductory course in educational research and evaluation methodology which considers the various methods of educational research, the formulation of research hypotheses, and the preparation of research reports.

ED 530. ADVANCED EDUCATIONAL PSYCHOLOGY. Class 3, cr. 3. Must be preceded by PSY 120 and ED 285.

Theories of learning and development, research on instruction and learning, and principles of measurement applied to educational problems.

ED 532. EDUCATIONAL ASSESSMENT OF EXCEPTIONAL CHILDREN. Class 2, Lab. 3, cr. 3. Prerequisite: Admission to special education certification program and a course in tests and measurements or permission of instructor.

An introduction to the procedures for educational assessment of exceptional children. Emphasis is given to criterion-referenced, norm-referenced and observational assessment instruments and procedures which are designed primarily for exceptional children. Laboratory experiences in the assessment of exceptional children are required.

ED 533. FOUNDATIONS IN THE EDUCATION OF EXCEPTIONAL CHILDREN. Class 3, cr. 3. Prerequisite: Completion of a teacher certification program or permission of instructor. May be repeated for credit.

Etiologies and characteristics of exceptional children with varying exceptionalities including (A) Developmental Learning, (B) Mental Retardation, (C)

Learning Disabilities, (D) Emotionally Disturbed, (E) Early Childhood, (F) Exceptional Adolescents, (G) Multiple Handicapped. Field trips to various programs are arranged. One topic is dealt with in each enrollment.

ED 534. STRATEGIES IN TEACHING EXCEPTIONAL CHILDREN WITH VARYING DISABILITIES. Credit 2.

Strategies for teaching exceptional children with varying exceptionalities including, (A) Task Oriented Instruction, (B) Mental Retardation, (C) Learning Disabilities, (D) Emotionally Disturbed, (E) Early Childhood, (F) Exceptional Adolescents, (G) Multiple Handicapped and Laboratory experience with exceptional children is required in (A) Task Oriented Instruction. One topic is dealt with in each enrollment.

ED 535. SUPERVISED TEACHING DF EXCEPTIONAL CHILDREN WITH VARYING DISABILITIES. Cr. 4.

Supervised teaching of exceptional children with varying exceptionalities including, (A) Specialized Assignments, (B) Mental Retardation, (C) Learning Disabilities, (D) Emotionally Disturbed, (E) Early Childhood, (F) Exceptional Adolescents, (G) Multiple Handicapped. Laboratory experience is required. One topic is dealt with in each enrollment.

ED 546. FOUNDATIONS OF EDUCATIONAL ADMINISTRATION. Class 3, cr. 3.

Administration of education; roles of local, state, and federal government. Focus on purpose, organization, task areas, and processes of educational administration.

ED 547. EDUCATIDNAL FACILITIES PLANNING. Cr. 3. Must be preceded by ED 546 or consent of instructor.

Systems approach as a basis for school facilities planning. Study directed toward procedures for solving facilities problems. Emphasis on techniques for developing and securing technical information.

ED 548. ECONDMICS OF EDUCATION. Class 3, cr. 3. Must be preceded by ED 546 or consent of instructor.

A general course in financing education including current economic theories, sources of revenues, and trends in fiscal structure and operations in education.

ED 549. THE JUNIOR HIGH SCHOOL. Cr. 3.

Development, population, organization, purposes and methods of junior high schools, with major emphasis upon adolescent psychology and the curriculum.

ED 570. AUDIO-VISUAL MEDIA FOR EDUCATION. Cr. 1-3. (Two hours when workshop) Must be preceded by junior standing and three hours of educational psychology.

Evaluation, selection, and utilization of audio-visual media and techniques used in the instructional program of the modern school. Supervised sessions give experience in the use and evaluation of materials and equipment.

ED 571. PREPARATION OF INSTRUCTIDNAL MATERIALS. Class 1, Lab. 4, cr. 3.

Design and preparation of a variety of instructional materials for use by instructional materials specialists, teachers, librarians, and a-v coordinators in educational situations. Laboratory practice is provided in production of these materials.

ED 578. REFERENCE RESOURCES. Cr. 3.

A study of reference services in school media centers including the most commonly used reference sources in library and audio-visual materials. Bibliographical form is emphasized.

ED 579. AUDIO-VISUAL SERVICES IN SCHOOL MEDIA PROGRAMS. Cr. 2. Must be preceded by five hours of education and psychology.

Current trends, functions, and processes of media services in educational situations with emphasis on nonprint media.

ED 580. MEDIA FOR CHILDREN. Cr. 3. Must be preceded by junior standing and three hours of educational psychology.

Books, films, filmstrips, records, magazines and other resources provided in elementary media centers are studied and evaluated to meet the personal and educational needs of pupils in elementary schools. Emphasis is on wide reading of children's books and viewing of many media and their utilization with children.

ED 581. MEDIA FOR YOUNG ADULTS. Cr. 3. Must be preceded by junior standing and three hours of educational psychology.

Evaluation, selection, and use in the broad subject fields of printed, filmed, and recorded materials for young adults to meet personal and educational needs.

ED 582. CATALOGING AND CLASSIFICATIDN. Class 3, Lab. 2, cr. 3. Must be preceded by junior standing.

Principles of cataloging and classification of educational media and organization of

these resources, with laboratory practice in cataloging books and audio-visual materials and in ordering and using printed cards.

ED 583. ADMINISTRATION OF SCHOOL MEDIA PROGRAMS. Cr. 3. Must be preceded by ED 570, 571, 578, or consent of instructor.

Principles of administration and management of school media programs with emphasis on organization, program development, staff, budget, and space.

ED 584. PRACTICUM IN SCHOOL MEDIA CENTERS. Cr. 2-3. Must be preceded or accompanied by ED 570, 571, 578, 582, 583, and 580 or 581 or by special permission of the instructor.

Supervised field practice in training activities in school media centers which maintain high quality programs staffed by qualified training personnel.

ED 590. INDIVIDUAL RESEARCH PROBLEMS. Cr. 1-6. Must be preceded by six hours of psychology and six hours of education or equivalent professional training.

Opportunities for students to study particular problems under the guidance of a member of the staff. This plan of individualized instruction may be used in any field of education or vocational education. Does not include thesis work.

ED 591. EDUCATIONAL PROBLEMS OF TEACHERS. Cr. 1-4.

Primarily for experienced teachers desiring credit from special workshops or individual study. Topics of individual study will deal with problems arising from the professional work of classroom teachers.

GRADUATE LEVEL

ED 610. COUNSELING THEORIES AND TECHNIQUES. Class 6, cr. 5.

Must be preceded by satisfactory completion of six graduate hours of counselor education courses and admission by consent of instructor. Examination of major counseling theories; selection and use of counseling techniques in a supervised laboratory; application of theory and techniques within varying employment settings.

ED 611. SEMINAR IN THEORIES OF GROUP COUNSELING. Class 3, cr. 3. Must be preceded by ED 509.

A critical review of current concepts and theories with emphasis upon group counseling, leadership, membership methods, research and ethical considerations. Illustrative of major approaches examined are human relations training, basic encounter, transactional analysis, and Gestalt.

ED 612. ORGANIZATION AND ADMINISTRATION OF GUIDANCE. Class 2 or 3, cr. 2 or 3. Must be preceded by ED 510.

Procedures in organizing and administering guidance services; observation of programs operating in selected schools, industries, and service organizations, with particular emphasis on cooperative participation of various personnel.

ED 613. COUNSELING PRACTICUM: Class 1, Lab. 6, cr. 2 or 3. May be repeated for credit. Must be preceded by ED 610 and admission by consent of instructor.

(A) elementary school (B) secondary school (C) college (D) group supervised use of educational, vocational and personal counseling techniques with emphasis upon their use in the settings cited above.

ED 614. SUPERVISED FIELD PRACTICE IN COUNSELING OR COLLEGE PERSONNEL SERVICES. Cr. 1-6. May be repeated for credit. Must be preceded by six hours of counselor education and admission by consent of instructor.

Supervised field practice in schools, colleges or agencies in which there are counseling or student personnel services.

ED 615. ADVANCED COUNSELING PRACTICUM. Class 1, Lab. 6, cr. 3. Must be preceded by ED 613, PSY 423 and 523. Admission by consent of instructor.

Supervised use of educational, vocational and personal counseling techniques with emphasis upon more complex and difficult client situations. May be repeated for credit.

ED 618. COUNSELING SEMINAR. Class 3, cr. 1-4. May be repeated for credit. Open to graduate students who have successfully completed 12 semester hours of previous counseling and personnel services courses.

Recent investigation and research in (1) counselor supervision, (2) professional issues, (3) counseling theories, (4) education of counselors and student personnel workers, (5) counseling methodology, (6) vocational development, (7) elementary

school counseling, (8) counselor consultation, and (9) other relevant topics. One topic is dealt with in each enrollment.

ED 627. SECONDARY SCHOOL CURRICULUM. Cr. 2 or 3.

Objectives, organization, and administration of the secondary school curriculum.

ED 628. STUDENT ACTIVITIES IN THE SECONDARY SCHOOL. Cr. 3.

Philosophy, organization, and administration of student activities in junior and senior high schools.

ED 630. SECONDARY SCHOOL ADMINISTRATION. Cr. 3. Must be preceded by ED 546 or consent of instructor.

Study of the role and responsibilities of the secondary school principalship; focus on organization and administration of students, staff, and educational program; special consideration devoted to schedule construction, program accounting, and school and community relations.

ED 631. ELEMENTARY SCHOOL ADMINISTRATION. Class 3, cr. 3. Must be preceded by ED 546 or consent of instructor.

Study of role and responsibilities of the elementary school principalship; focus upon leadership functions in staff and pupil personnel, school and class organization, plant management, instructional and educational program, and school and community relations.

ED 632. SEMINAR: THE SCHOOL PRINCIPALSHIP. Cr. 2-4. Must be preceded by ED 630 or 631.

Individual exploration in depth of selected aspects of the school principalship and critical analysis of related issues.

ED 635. LEGAL ASPECTS OF AMERICAN EDUCATION. Cr. 3. Must be preceded by ED 546 or consent of instructor.

Legal foundations of education as established by constitutional provisions, legislative enactments, executive directives, opinions of attorney generals, and court decisions. Emphasis on legal principles currently in a state of change. Stress on the case study method of investigation into school law.

ED 636. SUPERVISION OF INSTRUCTION AND INSTRUCTIONAL PERSONNEL. Class 3, cr. 3. Must be preceded by ED 546 or consent of instructor.

Examination of the functions of school administration which focus on achievement of instructional expectations of educational service. Emphasis on developing an individualized supervisory program for instructional personnel.

ED 655. EVALUATION IN VOCATIONAL HOME ECONOMICS EDUCATION. Cr. 3. Must be preceded by 12 hours of education or equivalent professional training.

Evaluation theory and techniques for home economics teachers. Analysis, construction, and refinement of measuring instruments and interpretation of results of evaluation procedures in vocational home economics.

ED 656. SUPERVISION IN VOCATIONAL HOME ECONOMICS EDUCATION. Cr. 3. For graduates in home economics with teaching experience or by consent of instructor.

Purposes, principles and procedures of effective supervision in vocational home economics. Special emphasis given to preparation of supervising teachers of vocational home economics.

ED 661. PRACTICUM IN REMEDIAL READING. Class 1, Lab. 5, cr. 3. Must be preceded by ED 520 and 521. Admission by consent of instructor. May be repeated for credit at an advanced level.

Supervised clinical practice in reading with children or adults who are severely handicapped in reading.

ED 675. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. Class 3, cr. 3. Must be preceded by ED 320, its equivalent, or admission by consent of instructor.

Research, recent trends and current developments in the field of language arts and implications for classroom practice in the elementary school.

ED 676. READING IN THE ELEMENTARY SCHOOL. Class 3, cr. 3. Must be preceded by ED 326, its equivalent, or admission by consent of instructor.

Research, recent trends and current developments in the field of reading instruction. Emphasis will be on improving developmental reading in the elementary school programs rather than on surveying remedial programs.

ED 677. SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. Class 3, cr. 3. Must be preceded by ED 322, its equivalent, or admission by consent of instructor.

Social studies—content and place in the modern elementary education curriculum. Materials, instruction techniques, evaluation procedurees, and understanding the syntax of the structure of social studies.

ED 678. SCIENCE IN THE ELEMENTARY SCHOOL. Cr. 3. Must be preceded by ED 323, its equivalent, or consent of instructor.

Analysis of historical developments and present trends in elementary school science education; the designing, implementation, and evaluation of science programs; the role of research in present and future developments.

ED 679. ELEMENTARY SCHOOL CURRICULUM. Class 3, cr. 3. Must be preceded by 12 hours in education and psychology.

Needs of children and society; modern programs; procedures for developing a curriculum, including ways to improve the present offerings of a school.

ED 680. REVIEW OF RESEARCH IN ELEMENTARY EDUCATION. Cr. 3. Must be preceded by ED 430 or equivalent.

A study of research important generally to elementary education. Critical analysis of research in one area of special interest.

ED 681. IMPLICATIONS OF RESEARCH AND THEORY FOR PROBLEMS IN ELEMENTARY SCHOOLS. Class 3, cr. 3. Must be preceded by ED 680 or equivalent.

Identification and study of the major problems of elementary schools. Emphasis on developing problem-solving skills and their use in planning solutions to problems identified by individual students.

ED 688. SEMINAR IN SOCIAL STUDIES EDUCATION. Cr. 3. May be repeated for credit.

An investigation of various aspects of the teaching of the social studies. One topic is dealt with in each enrollment. Master's candidates are expected to complete the first three topics. Areas include: (1) philosophic concepts used in the social studies; (2) curricular analysis and examination of new school studies materials; (3) methods of inquiry in the social studies; (4) research methodology in the social studies.

ED 698. RESEARCH. M.S. Thesis.

Physical Education

UNDERGRADUATE LEVEL

PEMN 103. TEAM ACTIVITIES IN PHYSICAL EDUCATION. Class 1, Lab. 4, cr. 2. (PEM majors and minors.)

Theory and skill techniques in soccer, speedball, volleyball, and gymnasium procedures.

PEMN 104. GYMNASTICS. Class 1, Lab. 4, cr. 2. (PEMN majors and minors.)

Theory and skill techniques in apparatus and tumbling.

PEMN 105. PHYSICAL EDUCATION: ORIENTATION AND HISTORY. Class 2, cr. 2. (PEM majors and minors.)

An introduction to physical education which deals with historical development and current trends in this and related fields.

PEMN 153. BEGINNING SWIMMING. Lab. 3, cr. 1.

PEMN 154. INTERMEDIATE SWIMMING. Lab. 3, cr. 1.

PEMN 155. ADVANCED SWIMMING AND LIFESAVING. Lab. 3, cr. 1.

PEMN 156. TEACHING AND COACHING TECHNIQUES OF WATER ACTIVITIES. Lab. 3, cr. 1. Prerequisite: Red Cross Life Saving Card. Red Cross W.S.I. available.

PEMN 158. BEGINNING GOLF. Lab. 3, cr. 1.

PEMN 204. PHYSICAL EDUCATION RHYTHMIC ACTIVITIES. Class 1, Lab. 2, cr. 2. (PEM majors and minors.)

Theory and skill techniques in group games, dancing, and other social activities.

PEMN 205. PHYSICAL EDUCATION CURRICULAR ACTIVITIES. Class 1, Lab. 4, cr. 2. (PEM majors and minors.)

Theory and skill techniques in touch-flag football, archery, wrestling, and games.

PEMN 206. INDIVIDUAL AND DUAL ACTIVITIES FOR PHYSICAL EDUCATION. Class 1, Lab. 4, cr. 2. (PEM majors and minors.)

Theory and skill techniques in conditioning activities, tennis, badminton, squash, handball, and golf.

PEMN 302. APPLIED ANATOMY AND KINESIOLOGY. Class 3, cr. 3. (PEM majors and minors.) Prerequisite: anatomy course.

The muscles; emphasis on their functions in and their development for specific gymnastics and athletic activities.

PEMN 307. THE COACHING OF BASKETBALL. Lab. 3, cr. 1.

PEMN 308. THE COACHING OF TRACK AND FIELD. Lab. 3, cr. 1.

PEMN 309. THE COACHING OF BASEBALL. Lab. 3, cr. 1.

PEMN 314. PREVENTION AND TREATMENT OF ATHLETIC INJURIES. Lab. 4, cr. 2. (PEM majors and minors.)

PEMN 316. THE COACHING OF FOOTBALL. Lab. 3, cr. 1.

PEMN 404. ADMINISTRATION OF PHYSICAL EDUCATION AND ATHLETICS. Class 2, cr. 2. (8 PEM. el. HU.)

PEMN 405. PRINCIPLES AND PRACTICES IN ATHLETIC COACHING. Class 2, cr. 2. Prerequisites: PEM 302, 314, 474.

A synthesis of scientific information derived from the natural and social sciences which influence the training programs of individual and group efforts in competitive athletics.

PEMN 406. TESTS AND MEASUREMENTS IN HEALTH AND PHYSICAL EDUCATION. Class 2, Lab. 2, cr. 3.

PEMN 407. TEACHING EXPERIENCES IN PHYSICAL EDUCATION. Class 1, Lab. 4, cr. 2.

PEMN 413. ADVANCED ATHLETIC TRAINING. Class 3, Lab. 3, cr. 4.

Instruction and experience in athletic training for sophomores and juniors in the athletic training option. Not open as a general elective.

PEMN 474. PHYSIOLOGY OF EXERCISE. Class 1, Lab. 2, cr. 2. Prerequisites: BIOL 203 and 204, or six hours of biological sciences or the equivalent, or permission of the instructor.

Theory and laboratory experiences with physiological phenomena during exercise and recovery resulting from training and detraining.

DUAL LEVEL
Undergraduate-Graduate

PEMN 503. CURRICULUM CONSTRUCTION IN PHYSICAL EDUCATION. Class 3, cr. 3.

Curriculum planning and development with emphasis on the genetic approach. Programs from elementary school through the university level.

PEMN 505. SUPERVISION OF PHYSICAL EDUCATION. Class 3, cr. 3.

Principles of supervision of activities and programs in physical education. Special emphasis is given to junior high school and senior high school areas.

PEMN 507. HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION. Class 3, cr. 3. Must be preceded by at least 18 semester hours in science, 12 semester hours in education, and 24 semester hours in physical education, or equivalents.

Health and Safety

UNDERGRADUATE LEVEL

H&S 219. PERSONAL AND COMMUNITY HEALTH. Class 3, cr. 3.

Application of health science to selected health problems and issues with particular reference to the current health problems of the college population.

H&S 250. INTRODUCTION TO SAFETY EDUCATION. Class 3, cr. 3. (Formerly H&S 508.)

An introduction to the basic principles of safety and accident prevention, accident analysis, and the content of school safety instruction.

H&S 280. FIRST AID. Class 1, Lab. 2, cr. 2. (Formerly H&S 380.)

A basic course in first aid principles, procedures, and skills, which includes American Red Cross standard and advanced courses, and additional training in emergency care and human disaster. Emphasis is placed on practical application in everyday living.

H&S 319. SCHOOL HEALTH PROGRAMS. Class 2, cr. 2.

Introduction to school health practice with emphasis on the teacher's role and functions in the various phases of the school health program.

H&S 360. DRIVER EDUCATION: CLASSROOM INSTRUCTION. Class 3, cr. 3.

A basic course designed to introduce the prospective driver education teacher to the main ideas and concepts in driver education. Major emphasis is on the content and teaching procedures in the classroom phase of such a program.

H&S 461. DRIVER EDUCATION: BEHIND-THE-WHEEL TEACHING. Class 2, Lab. 2, cr. 3. Prerequisite: H&S 360.

The course will provide the prospective driver education teacher with the necessary knowledge and skills to conduct the behind-the-wheel phase of the high school driver education program.

GRADUATE LEVEL

H&S 605. SEMINAR IN SAFETY EDUCATION. Class 3, cr. 3. Prerequisite: six hours of safety education, of which at least three hours must be in driver education.

The critical analysis of current problems in safety education related to teaching and administering safety programs in the schools.

Recreation Leadership

RECR 301. FOUNDATIONS OF RECREATION. Class 3, cr. 3.

Designed to develop a philosophy of recreation in leisure, it will identify the principles of recreation and the many organizations functioning in our leisure. Only Recreation majors and minors, and P.E. majors.

Physical Education

PEW 217. PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL. Class 1, Lab. 4, cr. 3.

Current conceptions of elementary school physical education with a particular emphasis on curriculum implementation.

DEPARTMENT OF ENGLISH AND PHILOSOPHY

J. S. Tuckey, Head of Department

FACULTY: J. C. Carlisle, G. R. Fischer, B. G. Gawthrop, R. A. Geimer, T. R. Koenig, Z. J. Mistri, P. Moran, R. E. Nichols, Jr., S. E. Pauley, K. A. Schroeder, R. L. Selig, M. J. Shea, B. A. Smith, C. S. Stacy, S. Stark (Emeritus), S. F. Staton, C. B. Tinkham, J. S. Tuckey.

The Department of English and Philosophy offers a wide range of courses in writing, language, literature, and philosophy which, in conjunction with the general education requirements of the University and of the School of Humanities, Education, and Social Sciences, lead to the Bachelor of Arts degree. In addition, the department offers a selected series of graduate-level English courses, some of which may be elected by advanced undergraduates as part of their bachelor's degree studies. The department endeavors to help the student achieve: (1) a general historical knowledge of the language and literature of England and the United States; (2) an understanding and appreciation of literature as a fine art; (3) an ability to read and evaluate the written word; and (4) skill and grace in oral and written communication.

Although the English major frequently applies his collegiate study to a career in education or editorial work, the program itself exists to sharpen his powers of analysis, heighten his communicative abilities, and broaden his cultural awareness. At his discretion the English major may further widen his cultural scope or introduce a measure of specialization by tailoring his program

to include a minor in another field of the humanities, in social science or in education, or even in such disciplines as physical and biological sciences or home economics. The goal of the program is preparation for life and the professions through a liberal education.

Major Requirements:

For the Major in English, the student is expected to attain a general background in the history and principles underlying the English language, and a general historical knowledge of English and American literature and their backgrounds. Major emphasis is upon more thorough study of Shakespeare and of Milton or Chaucer. The teaching major is identical to the non-teaching major plus 16-18 additional hours in English and Communications courses and 18 hours of Education courses.

English Major: Departmental requirements include at least 24 hours in English courses (excluding Freshman Composition), as follows:

1. The following courses: 201; 327 *or* 328; 442 (three courses).
2. One course from each of these five groups: (a) 262, 264, 266; (b) 333, 335, 337; (c) 350, 351; (d) 375, 377, 381; (e) 441, 444.

Requirements of the School of Humanities, Education, and Social Sciences include 59-63 semester hours in general education. Further University requirements: sufficient elective courses to bring the total credits to 126.

English Teaching Major: The English teaching major, which can be teamed with any minor, provides teacher certification in secondary education in the state of Indiana. Department of English and Philosophy requirements include 40-42 semester hours in English and Communications courses (excluding Freshman Composition), as follows:

1. The following courses in English and Communications (21 semester hours): English 201, 327, 328, 442, 491; Communications 114; Communications 252 or 357 or 458.
2. One course from each of these five groups: (a) 262, 264, 266; (b) 333, 335, 337; (c) 350, 351; (d) 375, 377, 381; (e) 441, 444.
3. Four to six semester hours of electives from literature courses on the 200-level or higher (six semester hours).

Department of Education requirements include:

1. Education 285, 304, 405, 424, 485, plus a methods course in any minor taken.
2. Mathematics and science (14-16 semester hours).
3. Social science (15 semester hours).
4. Application for admission to teach education (in sophomore year).

Requirements of the School of Humanities, Education, and Social Sciences include 59-63 semester hours in general education courses, largely met by the requirements listed above. Further University requirements: sufficient elective courses to bring the total credits to 126 semester hours.

Students desiring to complete a teacher education program with a major or minor area in English Teaching must maintain a 4.5 grade average both in their over-all graduation index and in English courses.

English Minor: The English minor can be teamed with any major. Requirements: any 12 semester hours in English (excluding Freshman Composition). Courses and course groupings are totally elective.

English Teaching Minor: The English teaching minor can be teamed with any major. Department of English and Philosophy requirements: at least 24 semester hours in English courses (excluding Freshman Composition), as follows:

1. These four courses: 201; either 327 or 328; 442; 491.
2. One course from each of the following groups: (a) 262, 264, 266; (b) 333, 335, 337; (c) 350, 351; (d) 375, 377, 381.

Department of Education requirement: successful completion of Education 405.

UNDERGRADUATE LEVEL
Lower-Division Courses

ENGL 103. ADVANCED FRESHMAN COMPOSITION. Class 3, cr. 3. (Freshmen.)

A composition course for freshmen who have shown their superior writing ability by their high school achievement and their score on the verbal section on the College Entrance Examination. The course emphasizes expository writing on a high critical level and includes readings of essays and imaginative literature involving conflicting intellectual attitudes as subjects for writing.

The course is a substitute for ENGL 104 for students who qualify. Students who pass ENGL 103 are excused from ENGL 105 and those who fail ENGL 103 must take ENGL 104.

ENGL 104. ENGLISH COMPOSITION I. Class 3, cr. 3. **Prerequisite** for all courses in English except ENGL 2, 100, 103, 185, and 286.

Emphasis on the organization of the expository theme. Directed writing of themes based on personal experience, on the relationship between experience and language, and on the relationship between experience and ideas.

ENGL 105. ENGLISH COMPOSITION II. Class 3, cr. 3. Not open to students who have earned a grade of C or higher in ENGL 103.

The second half of the basic composition sequence. Emphasis on the logical and rhetorical problems involved in writing discursive essays. Directed writing of themes based largely on reading of discursive prose and imaginative literature. Normally to be taken immediately following ENGL 104 in the freshman year. A student who has received a grade of A in ENGL 104 may with the approval of his school substitute for ENGL 105 an elective course in English, usually a 200-level literature course.

ENGL 183. STUDY SKILLS AND VOCABULARY. Class 1, Lab. 2, cr. 1.

To develop such study methods as effective listening and note-taking, time-budgeting, test-taking, library usage, interpreting graphics, and techniques to improve concentration, retention, and review of materials; to build reading vocabulary through word analysis and practical context training.

ENGL 184. READING FOR COMPREHENSION. Class 1, Lab. 2, cr. 1.

To improve comprehension and develop effective reading techniques. Emphasis on recognizing main ideas and significant details, and on grasping organizational patterns through close analysis of textbooks and other materials.

ENGL 185. DEVELOPMENTAL READING. Lab. 2, cr. 1.

Purpose: to increase reading efficiency by improving comprehension and by developing the motor skills involved in reading speed. Motivates reading interest through use of films and pacers.

ENGL 201. THE NATURE OF LITERATURE STUDY. Class 3, cr. 3.

A study of literary concepts and critical procedures as applied to representative poetry, fiction, and drama, with practice in critical writing.

ENGL 220. TECHNICAL REPORT WRITING. Class 3, cr. 3.

A study of application of the principles of good writing in industrial reporting with emphasis on the techniques of presenting information graphically as well as in a clear, concise written form.

ENGL 227. INTRODUCTION TO THE ENGLISH LANGUAGE. Class 3, cr. 3.

Lectures and discussions on the main aspects of linguistics. Study of the background of American English, sounds and writing systems, grammatical approaches, social and regional language differences.

ENGL 230. INTRODUCTION TO LITERATURE. Class 3, cr. 3. Not open to students with credit for ENGL 238.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on types of narrative literature.

ENGL 231. INTRODUCTION TO LITERATURE. Class 3, cr. 3.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on various types of literature.

ENGL 232. THEMATIC STUDIES IN LITERATURE. Class 3, cr. 3. (May be repeated for credit.)

Examination of a particular theme, such as the hero, death, or the city, and the techniques by which it is treated in various literary works, usually in more than one genre.

ENGL 235. INTRODUCTION TO THE DRAMA. Class 3, cr. 3.

Reading and discussion of a number of plays, most of them modern, aimed at an appreciation of the drama as literature and as entertainment.

ENGL 237. INTRODUCTION TO POETRY. Class 3, cr. 3.

How to read poetry intelligently; function of description, metrics, figures of speech, and theme; place of a poem in history, uses of poetry, etc.

ENGL 238. INTRODUCTION TO FICTION. Class 3, cr. 3.

Reading and discussion of selected short stories and seven novels, to promote awareness, understanding, and appreciation of the range, values, techniques, and meanings of reputable modern fiction.

ENGL 240. INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE BEGINNINGS TO SWIFT AND POPE. Class 3, cr. 3.

A survey with emphasis on the study of selected texts from the major writers, this course aims at both competence in literary analysis and awareness of the relation between each writer and his times.

ENGL 241. INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE RISE OF ROMANTICISM TO THE TWENTIETH CENTURY. Class 3, cr. 3.

A continuation of ENGL 240, this course carries the same study from the mid-eighteenth to the twentieth century.

ENGL 250. GREAT AMERICAN BOOKS. Class 3, cr. 3.

Seven books, such as *The Scarlet Letter, Moby-Dick,* and *Walden,* read and discussed as to their literary qualities and their cultural significance.

ENGL 262. GREEK AND ROMAN CLASSICS IN TRANSLATION. Class 3, cr. 3.

Study of important works of Greek and Roman literature, their intrinsic literary values, and their influence on later European and American writing and thinking.

ENGL 264. THE BIBLE AS LITERATURE. Class 3, cr. 3.

A study of selections from the old and new testaments as examples of Hebrew and early Christian literature.

ENGL 266. WORLD LITERATURE: ANCIENT, MEDIEVAL, AND RENAISSANCE PERIODS. Class 3, cr. 3.

Western world literature in translation, primarily Greek, Hebrew, and early European—the basis of our cultural heritage; and particular attention to Homer, Greek drama, Plato, the Bible, and Renaissance writers.

ENGL 267. WORLD LITERATURE: EIGHTEENTH, NINETEENTH, AND TWENTIETH CENTURIES. Class 3, cr. 3.

Western world literature in translations and in English originals from about 1700 to the present; the changes and growth in our cultural heritage, as reflected primarily in French, English, German, and Russian imaginative writing.

ENGL 285. CRITICAL READING. Class 2, cr. 2. Prerequisite: ENGL 185, or consent of instructor.

Close reading of selected current magazines and newspapers, emphasizing efficient techniques for finding general meaning. Includes the application of elementary logical and semantic analysis.

ENGL 286. VOCABULARY BUILDING. Lab. 2, cr. 1.

Development of vocabulary through study of the characteristics of the language, usage, and word formation; exercises and dictionary practice; selected reading.

UNDERGRADUATE LEVEL
Upper-Division Courses

(General prerequisite for all English courses numbered from 300 to 499; fulfillment of the basic composition requirement and three hours of literature, or equivalent preparation.)

ENGL 304. ADVANCED COMPOSITION. Class 3, cr. 3.

Designed for students who wish additional training in composition beyond the basic requirements. Extensive practice in the writing of mature expository, critical, and argumentative prose. (This course satisfies the Indiana certification requirements for three hours of advanced composition.)

ENGL 327. ENGLISH LANGUAGE I: HISTORY AND DEVELOPMENT. Class 3, cr. 3.

This course and 328 will satisfy the English language requirement for teacher certification.

History and rationale of the scientific study of English and a survey of the development of English sounds, inflections, syntactical patterns, and vocabulary.

ENGL 328. ENGLISH LANGUAGE II: DESCRIPTION AND ANALYSIS. Class 2, Lab. 2, cr. 3.

Application of structural analysis to American English in light of the constructive criticism offered by traditional, generative-transformational, and other grammars. Relevance of recent study to the teaching of English.

ENGL 333. RENAISSANCE ENGLISH LITERATURE. Class 3, cr. 3.

An introduction to the literature of the English Renaissance through an intensive reading of representative authors, including but not limited to Jonson, Spenser, Donne, Bacon, and Marlowe.

ENGL 335. RESTORATION AND EIGHTEENTH-CENTURY ENGLISH LITERATURE. Class 3, cr. 3.

A study of the major British writers from 1660 to 1800, focusing upon but not restricted to Dryden, Swift, Fielding, Pope, and Johnson.

ENGL 337. NINETEENTH-CENTURY BRITISH LITERATURE. Class 3, cr. 3.

A study of major British nineteenth-century writers such as Shelley, Arnold, and Hardy, with emphasis on poetry and the essay.

ENGL 350. AMERICAN WRITERS FORM 1800 to 1865. Class 3, cr. 3.

Not open to students who have credit for ENGL 250. Deals with writers generally called the Romantics and Transcendentalists, with the emphasis on Irving, Cooper, Bryant, Hawthorne, Poe, Melville, Emerson, Thoreau, and Whitman. Others will be read and connections made between their work and the times.

ENGL 351. AMERICAN WRITERS FROM 1865 to 1910. Class 3, cr. 3. Not open to students who have earned credit for ENGL 250.

Deals with writers of the "Gilded Age" and at the turn of the century. Students will read the work of writers associated with the regional and local color movements, the rise of realism, and the beginnings of naturalism. The principal writers are Dickinson, Twain, Adams, Howells, James, Crane, Robinson, and Dreiser. Others will be read and connections made between their work and the times.

ENGL 372. INTRODUCTION TO AMERICAN FOLKLORE. Sem. 1 and 2. Class 3, cr. 3.

Introduction to the study of Anglo-American traditions, folk tale, song, dance, humor, superstition, games, beliefs, etc., with emphasis on informal discussion of readings, recordings, movies, and lectures.

ENGL 375. BRITISH DRAMA TO 1800, EXCLUSIVE OF SHAKESPEARE. Sem. 2. Class 3, cr. 3.

Reading and discussion of major works of British drama from its medieval beginnings to 1800, including but not limited to Shakespeare's contemporaries (Marlowe, Jonson, and Webster) and the chief Restoration and eighteenth-century playwrights (Wycherley, Congreve, and Sheridan).

ENGL 376. THE MOVIES. Sem. 1 and 2. Class 2, Lab. 3, cr. 3.

The history and aesthetics of the movies from *The Great Train Robbery* and *The Birth of a Nation* or *Intolerance* to contemporary films. Comparison of the cinematic method with the methods of the drama and the novel. One afternoon or evening a week for the screening of films; two periods a week for discussion.

ENGL 377. MAJOR MODERN POETRY. Sem. 1. Class 3, cr. 3.

The development of new trends in and the interrelationships among the poetry

of Ireland, Britain, and the United States. Poets central to modernism, such as Yeats, Pound, Eliot, Williams, and Stevens will be emphasized, and students will also read more recent poets.

ENGL 381. THE BRITISH NOVEL. Class 3, cr. 3.
Studies in the historical development and aesthetic achievement of the British novel, with reading and discussion of representative works from the eighteenth century on.

ENGL 382. THE AMERICAN NOVEL. Class 3, cr. 3.
Reading and discussion on representative American novels from Hawthorne to Faulkner, emphasizing major trends in purpose, content, and technique. Supplementary lectures on background materials.

ENGL 383. MODERN DRAMA SINCE IBSEN. Class 3, cr. 3.
Reading and discussion of major works of Continental, British, and American drama from Ibsen to the present, with emphasis on techniques, forms, and themes.

ENGL 386. HISTORY OF THE FILM TO 1938. Sem. 1. Class 3, Lab. 2, cr. 3. Prerequisite: consent of instructor.
A survey of the American and European cinema from its origins in technology and realism to the aesthetic implications presented by the coming of sound. Emphasis on the feature film and on the prevalent aesthetic attitudes in the first decades of the motion picture.

ENGL 387. HISTORY OF THE FILM FROM 1938 TO THE PRESENT. Sem. 2. Class 3, Lab. 2, cr. 3. Prerequisite: consent of instructor.
A survey of international cinema for the period indicated. Emphasis on the feature film and its development as a communication tool, popular art form, medium of personal expression, and self-exploring linguistic system.

ENGL 396. STUDIES IN LITERATURE AND LANGUAGE. Class 3, cr. 3.
A course in the study of a special topic directed by an instructor in whose particular field of specialization and content of the course falls.

ENGL 405. CREATIVE WRITING. Class 3, cr. 3. (May be repeated for credit.)
Informally conducted for students who enjoy writing—of any kind except the narrowly technical—and concerned with problems of form, style, diction, sentence structure. Workshop criticism.

ENGL 420. BUSINESS WRITING: GENERAL APPLICATIONS. Class 3, cr. 3.
Application of business writing principles to the preparation of common letter types, reports, and advertising copy. Sales, adjustment, collection, and employment letters are stressed.

ENGL 421. TECHNICAL WRITING: ENGINEERING AND SCIENCE APPLICATIONS. Class 3, cr. 3.
Study of the types of letters and reports in engineering. Practice in their preparation. Consideration of the qualities found in engineering papers.

ENGL 441. CHAUCER'S CANTERBURY TALES. Class 3, cr. 3.
Critical reading of the *Canterbury Tales* in Middle English with attention to the literary and cultural background.

ENGL 442. SHAKESPEARE. Class 3, cr. 3.
Shakespeare's dramatic craftsmanship, poetry, humor, characterization, psychology, and modern pertinence illustrated in representative tragedies, comedies, and history plays.

ENGL 444. MILTON'S MAJOR POETRY. Class 3, cr. 3.
A study of Milton's major poetry, with particular emphasis upon *Paradise Lost* and *Samson Agonistes.*

ENGL 455. MAIN CURRENTS OF AMERICAN THOUGHT. Class 3, cr. 3.
A survey of dominant ideas and intellectual trends in America from 1607 to the present as revealed through American literature and as related to American life and culture.

ENGL 456. AMERICAN HUMOR. Class 3, cr. 3.
Humorous writings of the nineteenth and twentieth centuries are studied as to form and technique and also as a reflection of American life. Special emphasis on Mark Twain.

ENGL 457. LITERATURE OF BLACK AMERICA. Class 3, cr. 3.
An examination of the literary, social, and historical importance of American literature by and about the American Negro. Readings will range from the earliest American period to the present with attention when appropriate to "sub-literary" work such as folk literature and the rhetoric of spokesmen of the race question.

ENGL 464. RELIGIOUS CLASSICS IN THE WESTERN TRADITION. Sem. 1. Class 3, cr. 3.

The course consists of the study of several important works which represent various kinds of religious insights in operation in Western culture. Augustine, Dante, Pascal, Kierkegaard, and Dostoevski are among the writers represented.

ENGL 479. THE SHORT STORY. Class 3, cr. 3.
A historical and critical study of nineteenth- and twentieth-century short stories—Irish, British, American, and continental.

ENGL 491. COMPOSITION FOR ENGLISH TEACHING MAJORS. Class 3, cr. 3.
Intensive practice in writing exposition and in annotating high-school students' compositions. Satisfies the Indiana certification requirement for three hours of advanced composition.

ENGL 493. DIRECTED READING. Cr. 1-3. Admission by consent of instructor. (May be repeated for credit.)
Directs the reading of students with special interests. Guides students in profitable reading in subjects of their own choice. Individual conferences only—no class meeting.

GRADUATE LEVEL
Undergraduate-Graduate

(General prerequisite for all English literature courses numbered above 500: fulfillment of the basic composition requirement and six hours of literature, or permission of the instructor.)

ENGL 506. ENGLISH LINGUISTICS. Class 3, cr. 3.
Summary of ways of approaching language study, historical and descriptive analysis of English. Comparison of traditional, structural, and generative grammars. Survey of current research.

ENGL 507. POETRY WRITING. Class 3, cr. 3. Admission by consent of instructor after submission of manuscripts. (May be repeated for credit.)
Writing of poems with a view to publication in the literary journals and "little" magazines. Criticisms by class and instructor. Sampling of current poetry publication.

ENGL 508. PLAY WRITING. Sem. 2. Class 3, cr. 3. (Same as THTR 576.) Admission by consent of instructor. (May be repeated for credit.)
Principles of dramatic construction and practice in the writing of one-act and three-act plays. Experimental production or laboratory testing of the written product when possible.

ENGL 509. SHORT STORY WRITING. Sem. 2. SS. Class 3, cr. 3. Admission by consent of instructor. (May be repeated for credit.)
Writing of several short fictional narratives. Study of short story techniques, particularly in these manuscripts. Cooperative criticism by class and instructor.

ENGL 510. THE DEVELOPMENT OF STANDARD ENGLISH. Class 3, cr. 3.
Consideration of all aspects of the language objectively. Through inductive and descriptive techniques, explanation of present-day English stressing historical continuity. Variations in usage studied realistically. Recommended for prospective teachers and others interested in English language problems.

ENGL 512. DESCRIPTION OF MODERN ENGLISH. Class 3, cr. 3. Prerequisite: ENGL 506 or AUSL 580 or consent of instructor.
Survey of assumptions and techniques of various schools of descriptive analysis. Comparisons of linguistic devices. Critical study of grammar.

ENGL 514. REGIONAL AND SOCIAL DIALECTS OF AMERICAN ENGLISH. Class 3, cr. 3. Prerequisite: ENGL 506 or AUSL 580.
All students should be made to realize that any dialect, whether regional or social, is a linguistic system in its own right; with this knowledge, they are likely to change their attitudes toward speakers of other dialects. The need for this change is apparent in America today.

ENGL 515. BUSINESS WRITING: JOURNALISTIC APPLICATIONS. Sem. 2. Class 3, cr. 3.
Study of the aims, functions, and organization of technical journals, company publications, and trade journals; writing of articles and other papers slanted toward such publications.

ENGL 525. FIELD METHODS IN LINGUISTICS. (See AUSL 681.)

ENGL 527. GENERAL LINGUISTIC SCIENCE. (See AUSL 580.)

ENGL 531. THE ENGLISH NOVEL THROUGH 1800. Class 3, cr. 3.

A study of such novelists as Defoe, Richardson, Fielding, Smollett, Sterne, and Jane Austen.

ENGL 532. THE ENGLISH NOVEL IN THE NINETEENTH CENTURY. Class 3, cr. 3.
A survey of fiction up to about 1880, including such novelists as Scott, Dickens, Thackery, the Brontës, Eliot, and Meredith.

ENGL 533. TUDOR LITERATURE. Class 3, cr. 3.
Nondramatic literature of the English Renaissance up to 1603, particularly the Elizabethan. Representative selections in both prose and verse are studied, with special attention to Spenser, Sidney, and Shakespeare.

ENGL 534. SEVENTEENTH-CENTURY LITERATURE. Class 3, cr. 3.
Nondramatic literature, 1603 to 1660. Particular emphasis upon such figures as Jonson, Donne, Marvell, and Herbert, with representative prose from Bacon, Browne, Burton, and others.

ENGL 535. RESTORATION AND EARLY EIGHTEENTH-CENTURY LITERATURE. Class 3, cr. 3.
A survey of the nondramatic literature from 1660 to 1744, from Clarendon through Thompson. Emphasizes Bunyan, Dryden, Pope, Swift.

ENGL 536. LATER EIGHTEENTH-CENTURY LITERATURE. Class 3, cr. 3.
A survey of the nondramatic literature from 1744 to 1798, from Young through Gibbon and Cowper. Excludes the novel. Emphasizes Johnson and his circle and Gray and his circle.

ENGL 537. ENGLISH DRAMA TO 1642. Class 3, cr. 3.
A survey of the English drama from the beginning, through Marlowe and Jonson, to the closing of the theaters (excluding Shakespeare).

ENGL 538. ENGLISH DRAMA FROM THE RESTORATION TO THE MODERN PERIOD. Class 3, cr. 3.
A survey of the English drama from Dryden and Wycherley through Robertson and Pinero.

ENGL 541. CHAUCER. Class 3, cr. 3.
Intensive study of the development of Chaucer's literary work with consideration of his language, his sources, and various critical approaches to his poetry.

ENGL 542. SHAKESPEARE'S COMEDIES AND TRAGICOMEDIES. Class 3, cr. 3.
A study of the development of Shakespeare's comic art from the early comedies through the later comedies and tragicomedies. Ten to 12 plays will be read.

ENGL 543. SHAKESPEARE'S TRAGEDIES AND HISTORY PLAYS. Class 3, cr. 3.
A study of the early and mature tragedies, the English histories, and the Roman plays. Ten to 12 plays will be read.

ENGL 544. MILTON. Class 3, cr. 3.
A study of Milton's poetry and prose, with particular emphasis on *Paradise Lost,* and some attention to the social, political, and literary background.

ENGL 547. THE ROMANTIC MOVEMENT IN ENGLISH LITERATURE. Class 3, cr. 3.
Principal writers of the Romantic Movement (Burns to Keats), emphasizing Wordsworth; relation of the historical background to the thought and feeling of the writers concerned.

ENGL 548. VICTORIAN LITERATURE. Class 3, cr. 3.
A survey of English poetry and prose from about 1832 to 1880.

ENGL 549. ENGLISH LITERATURE 1880-1920. Class 3, cr. 3.
A survey of transitional developments (outside the drama) in such writers as Pater, Wilde, Butler, Gissing, Moore, and Wells and such movements as aestheticism, decadence, naturalism, and impressionism.

ENGL 553. COLONIAL AND EARLY AMERICAN LITERATURE. Class 3, cr. 3.
A survey of American literature from the beginning to about 1820, concluding with such writers as Brackenridge, Brown, and Tyler.

ENGL 554. THE AMERICAN RENAISSANCE. Class 3, cr. 3.
A survey of American literature from about 1820 to 1855, concluding with Melville.

ENGL 556. NINETEENTH-CENTURY AMERICAN FICTION. Sem. 2. Class 3, cr. 3.
Surveys the development of American fiction from its beginnings. Though representative works of all periods will be read, emphasis will be given to Hawthorne, Melville, Twain, and James.

ENGL 558. THE RISE OF REALISM IN AMERICAN LITERATURE. Class 3, cr. 3.
A survey of American literature from about 1855 to 1900, beginning with Whitman and ending with James and the early naturalists.

ENGL 559. TWENTIETH-CENTURY AMERICAN LITERATURE. Class 3, cr. 3.

A survey of the major literary genres—poetry, fiction, drama, essays, and criticism—since 1900.

ENGL 567. LITERARY CRITICISM I. Sem. 1. Class 3, cr. 3.

A comprehensive historical survey of the main figures, concepts, approaches, and movements in literary criticism from Plato to the close of the eighteenth century.

ENGL 568. LITERARY CRITICISM II. Sem. 2. Class 3, cr. 3.

A continuation of ENGL 567, beginning with the romantic movement and including classification, analysis, and evaluation of the various schools, traditions, modes, and disciplines of modern criticism.

ENGL 572. MODERN BRITISH DRAMA. Class 3, cr. 3.

Representative plays by major British playwrights from 1893 to the present.

ENGL 573. TRAGEDY. Sem. 2. Class 3, cr. 3.

The chief tragic views of life, as illustrated in Greek, Shakespearean, and modern drama, as well as in the novel and poetry, with selected readings on the theory of tragedy.

ENGL 574. THE CONTINENTAL NOVEL. Sem. 2. Class 3, cr. 3.

Reading and discussion of representative novels from European and Russian literature from the seventeenth century to the present, by such writers as Cervantes, Flaubert, Tolstoi, Dostoevski, Proust, Mann, and Kafka.

ENGL 575. MODERN AMERICAN DRAMA. Class 3, cr. 3.

Representative plays by major American playwrights from 1920 to the present.

ENGL 576. PHILOSOPHY AND LITERATURE. Class 3, cr. 3. Prerequisites: six hours of philosophy or six hours of literature, or three hours of each, or permission of instructor.

(Same as PHIL 576.) An intensive examination of the structure of literature, the bearing of literary style of philosophical ideas, and the application of philosophical categories to literary criticism.

ENGL 577. MODERN ENGLISH AND AMERICAN POETRY. Class 3, cr. 3.

Surveys modern poetry from Hardy to Auden; relates it to the main currents of contemporary thought and feeling; introduces elementary critical principles.

ENGL 578. MODERN AMERICAN FICTION. Class 3, cr. 3.

Critical study of twentieth-century novels and short stories, including works by such writers as James, Faulkner, and Hemingway.

ENGL 579. MODERN BRITISH FICTION. Class 3, cr. 3.

Critical study of twentieth-century novels and short stories by such writers as Conrad, Lawrence, and Forster. Special attention is given to James Joyce's *Ulysses*.

ENGL 580. LITERATURE AND MODERN THOUGHT. Class 3, cr. 3.

Reading in literature, philosophy, and social criticism, concentrated on the political, industrial, and scientific revolutions that have molded modern life and thought.

ENGL 581. ETHICAL PROBLEMS IN MODERN LITERATURE. Sem. 2. Class 3, cr. 3.

Chief ethical systems. Novels written by writers with contrasting ethical assumptions. Ethical problems considered both abstractly and concretely.

ENGL 584. LITERATURE AND PSYCHOLOGICAL PROBLEMS. Sem. 2. Class 3, cr. 3.

A study of novels, stories, plays and other types of literature dealing with important psychological problems, to show how great imaginative writers have treated problems of human relationship with which contemporary psychology is concerned.

ENGL 587. DEVELOPMENTAL READING FOR TEACHERS. Class 2, Lab. 2, cr. 3. Techniques for improving reading skills.

Introduction to laboratory method. Research and reading in the field, and interning in the laboratories. Recommended for prospective teachers of reading.

ENGL 590. DIRECTED WRITING. Cr. 1-3. Prerequisite: consent of the instructor. (May be repeated for credit.)

Writing—creative, popularly technical, biographical, historical, philosophical—on subjects of the student's choice. Individual conferences only. No class meetings.

ENGL 593. CONTEMPORARY BRITISH FICTION. Class 3, cr. 3.

Critical study of the British novel since World War II. Survey of scholarship and

criticism. Examinations and critical papers.

ENGL 594. CONTEMPORARY POETRY. Class 3, cr. 3.

American and foreign poetry of the past two decades. Attention to influences, "schools," and poetry magazines. Outside reading. Critical papers.

ENGL 595. CONTEMPORARY AMERICAN FICTION. Class 3, cr. 3.

Study of fiction of the past two or three decades as it relates to American literary traditions and thought. Survey of scholarship and criticism. Examinations and critical papers.

ENGL 596. ADVANCED STUDIES IN LITERATURE AND LANGUAGE. Class 3, cr. 3.

A course in the study of a special topic directed by an instructor in whose particular field of specialization the content of the course falls. Emphasis on critical analysis, scholarly techniques, and secondary materials.

GRADUATE LEVEL

ENGL 601. METHODS OF LITERARY STUDY. Class 3, cr. 3.

Introduction to the tools and techniques of literary research, including the study of methods of bibliography, varying critical approaches, and the writing of scholarly papers.

ENGL 627. SEMINAR IN ENGLISH LINGUISTICS. Cr. 3.

Investigation into various aspects of linguistics. Problems arising from research interests of individual students.

ENGL 633. SEMINAR IN ENGLISH LITERATURE BEFORE 1660. Cr. 3.

Variable subjects (authors, themes, periods, movements) in English literature from "Beowulf" to "Paradise Lost." May be repeated for credit.

ENGL 635. SEMINAR IN ENGLISH LITERATURE 1660-1783. Cr. 3.

Intensive consideration of one to three or four authors or of literary topics and genres (largely exclusive of drama and fiction), such as literary criticism and literary history, the medieval revival, poetic and prose satire, the periodical essay, biography, etc.

ENGL 642. SEMINAR IN SHAKESPEARE. Cr. 3.

Practice in the most successful modern methods of Shakespeare scholarship and criticism study of text, sources, staging, dramatic technique, language, thought, etc. Normally three or four plays will be examined intensively from these points of view.

ENGL 647. SEMINAR IN THE ROMANTIC MOVEMENT. Cr. 3.

A close investigation of the works of one or more outstanding writers of English literature from 1783-1832, their place in the Romantic Movement, and their historical and cultural relations to the times.

ENGL 648. SEMINAR IN VICTORIAN LITERATURE. Cr. 3.

A detailed study of the works of one or more figures of English literature from 1832-1880: their relation to the literary movements and historical and cultural backgrounds of the age.

ENGL 649. SEMINAR IN ENGLISH LITERATURE 1880-1920. Cr. 3.

Subjects will range from individual authors and specific literary types to transitional literary movements.

ENGL 655. LITERATURE AND IDEAS IN AMERICA. Sem. 2. Class 3, cr. 3.

Dominant ideas and intellectual trends in America from 1607 to the present as revealed through American literature and as related to American life and culture.

ENGL 657. SEMINAR IN AMERICAN LITERATURE BEFORE 1900. Cr. 3.

A variable content course ranging from the colonial period in American letters to the turn of the twentieth century. Authors, ideas, types of literature, and significant literary movements will be variously explored.

ENGL 677. SEMINAR IN MODERN LITERATURE. Cr. 3.

Developments in English, American, and European literature in modern times. Individual seminars will ordinarily be concerned with drama, poetry, or fiction, but may treat all three types together.

ENGL 678. SEMINAR IN MODERN AMERICAN FICTION. Sem. 2. Cr. 3.

Intensive study of one or two authors, of a limited period, or of themes and movements. Oral reports and research papers required. May be repeated for credit.

ENGL 679. SEMINAR IN MODERN BRITISH FICTION. Cr. 3.

Study in depth of one or two major novelists, a literary movement, a group of writers, or a form of modern fiction. Oral reports and research papers required. May be repeated for credit.

ENGL 691. SEMINAR IN THE ENGLISH LANGUAGE ARTS. Class 3, cr. 3.

Problems in the teaching of English: literature, language, rhetoric. Attention to recent scholarship and to its application in the public schools. May be repeated for credit with the permission of the instructor.

ENGL 693. DIRECTED READING. Cr. 1-3. Admission by consent of instructor.

Directs the reading of students with special interests. Guides students in profitable reading in subjects of their own choice. Individual conferences; no class meetings. May be repeated for credit.

ENGL 696. SEMINAR IN LITERATURE. Cr. 3.

Advanced study of special subjects.

ENGL 698. RESEARCH. M.A. Thesis.

PHILOSOPHY COURSES:

UNDERGRADUATE LEVEL

PHIL 110. INTRODUCTION TO PHILOSOPHY. Class 3, cr. 3.

The basic problems and types of philosophy, with special emphasis upon the problem of knowledge and nature of reality.

Satisfies the philosophy requirement of the School of Humanities, Education, and Social Sciences.

PHIL 111. ETHICS. Class 3, cr. 3.

A study of the nature of moral value and obligation. Topics such as the following will be considered: different conceptions of the good life and standards of right conduct; the relation of nonmoral and moral goodness; determinism, free will, and the problem of moral responsibility; the political and social dimensions of ethics; the principles and methods of moral judgment. Readings will be drawn both from contemporary sources and from the works of such philosophers as Plato, Aristotle, Aquinas, Butler, Hume, Kant, and J. S. Mill. Satisfies the philosophy requirement of the School of Humanities, Education, and Social Sciences.

PHIL 150. PRINCIPLES OF LOGIC. Class 3, cr. 3.

A study of the principles and methods employed in the logical appraisal of arguments. Topics such as the following will be considered: semantic principles and problems; informal fallacies; syllogistic logic; truth-functional logic; the logic of quantification; and inductive logic. Satisfies the philosophy requirement of the School of Humanities, Education, and Social Sciences.

PHIL 201. HISTORY OF ANCIENT PHILOSOPHY. Sem. 1. Class 3, cr. 3.

A survey of ancient western philosophy from Thales through Plotinus. Selected readings, examinations, and essays on the pre-Socratic philosophers, Plato, Aristotle, and Hellenistic and Roman philosophy. This is the first in the three course history of philosophy sequence. (PHIL 201, 202, 203), but any one of these may be taken without the others.

PHIL 203. HISTORY OF MODERN PHILOSOPHY. Class 3, cr. 3.

Readings in, lectures on, and discussions about the major and minor philosophical figures from the Renaissance through Kant. This includes fairly intensive study of the works of Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume and Kant. Contemporary nonphilosophical figures such as Newton and Calvin are also considered.

PHIL 206. PHILOSOPHY OF RELIGION. Class 3, cr. 3.

The nature and origin of religion. A critical examination of the idea of God, the nature of evil, immorality, and worship.

PHIL 240. SOCIAL PHILOSOPHY. Class 3, cr. 3.

A study of the dominant types of social thought from Plato to John Dewey.

PHIL 375. THE PHILOSOPHY OF ART. Class 3, cr. 3.

A survey of the principal theories concerning the nature, function, and value of the arts from classical times to the present.

PHIL 400. NINETEENTH-CENTURY PHILOSOPHY. Class 3, cr. 3. Prerequisite: PHIL 110.

A study of the major movements and directions of nineteenth-century philosophy, including such men as Hegel, Comte, Mach, Schopenhauer, Nietzsche, Mill, Royce, and Peirce.

PHIL 432. THEORY OF KNOWLEDGE. Class 3, cr. 3. Prerequisite: PHIL 110, 201, or 203.

A study and analysis of selected classical and contemporary texts on the criteria and meaning of knowledge claims: rationalism, empiricism, idealism, pragmatism, logical empiricism, and the influence of ordinary language philosophy. Special problems such as the problems of perception and memory may also be considered.

DUAL LEVEL
Undergraduate-Graduate

PHIL 507. RECENT AMERICAN PHILOSOPHY. Class 3, cr. 3. Prerequisite: PHIL 110, 201, or 203.

A detailed examination of the central doctrines of six American philosophers: Peirce, James, Royce, Santayana, Dewey, and Whitehead.

PHIL 520. EXISTENTIALISM. Class 3, cr. 3. Prerequisite: PHIL 110, 203, or 405.

A detailed exploration and examination of the existentialist movement in modern thought, including its historical roots, its philosophical formulations, and its influence and expression in and relation to art, literature, psychology, social criticism, and religion. Readings will be from the major existentialists: Kierkegaard, Jaspers, Heidegger, Sarte, and Marcel. In addition, texts from existentialist thinkers in other areas will be used.

FOODS AND NUTRITION—See School of Home Economics

FRENCH—See Department of Modern Languages

GENERAL STUDIES

A. D. Sander, in charge

UNDERGRADUATE LEVEL
Lower-Division Courses

GS 101. PERSPECTIVES ON CONTEMPORARY ISSUES. Class 3, cr. 3.

Designed to provide broad perspectives on issues of current concern with an emphasis on informal student-teacher interaction. This course will begin with discussions of the nature and role of education, moving to contemporary problems selected by students and instructors. Probable issues for study include civil rights, racism, war and peace, social change, mass society, and alienation.

GS 150. PERSONAL GROWTH AND DEVELOPMENT. Class 4, cr. 3.

A multilevel approach to the promotion of personal growth and development through a modified human relations laboratory experience. Designed also to increase learning efficiency and skills through application of basic psychological principles. Two types of activities will be employed: (1) skilled training activities and exercises; and (2) small group discussions of feelings, ideas, and relationships common to all participants.

GERMAN—See Department of Modern Languages

HEALTH AND SAFETY—See Department of Education

DEPARTMENT OF HISTORY AND POLITICAL SCIENCE

S. Lerner, Head

FACULTY: E. G. De Felice, M. W. H. Grote, E. P. Keleher, S. Lerner, H. J. Merry, (Emeritus), D. F. Pierce, J. W. Pringle, A. D. Sander, N. L. Trusty, R. A. Van Orman

American History or European History Major.

The Calumet Campus offers the Bachelor of Arts degree in American and European history as well as the courses necessary to be certified as a high school

teacher of United States or world history within the social studies teaching major.

While the course of study is designed to provide the student with a broad cultural background, students majoring in history who complete their education at the baccalaureate level find employment in business, industry, and government service along with other graduates of liberal arts programs. The study of history can also be used to meet the requirements for entrance into a law school. Those who continue their study of history and attain advanced degrees can become college teachers.

American History Major.

The American History Major consists of 33 hours of various history courses and is designed to provide broad familiarity with areas of American and European History. No minor is required. Prerequisites to the major are Hist 151—American History to 1877 and Hist 152—US History since 1877. The major consists of Hist 104—Modern Civilization, Hist 582—The Art of History, one three-hour course in 100 or 200-level non-US History, two three-hour courses in 300, 400, or 500-level non-US History, and six 300, 400, or 500-level courses in US History (distributed among several categories of courses).

European History Major.

The European History Major consists of 33 hours of various history courses and is designed to provide broad familiarity with various areas of American and European History. No minor is required. Prerequisites to the major are two courses selected from among Hist 102—Ancient World, Hist 103—Medieval World, and Hist 104—Modern Civilization. The major consists of Hist 582—The Art of History, two three-hour courses in 100 or 200-level US or Latin American history courses, two three-hour 300, 400, or 500-level courses in non-European History, and six 300, 400, or 500-level courses in European History (distributed among several categories of courses).

History Minor.

The History Minor consists of 15 hours of various history courses. The prerequisite to the minor is Hist 104—Modern Civilization. The minor consists of Hist 151—American History to 1877, Hist 152—US History since 1877, and nine hours of 300, 400, and 500-level courses in History.

Political Science Major.

Political science is the systematic study of politics, one of the most important elements of our social existence. The department's program is designed to provide an understanding of the rights and obligations of the citizen, a knowledge of the functioning and role of government, and a purposeful general preparation for the entry into any of the professions, especially law, teaching and business. Undergraduates majoring in political science are enabled to secure a more comprehensive background for public affairs and public service and some specialized training in any of the major areas of the discipline. The Calumet Campus offers the B.A. in political science, as well as all of the courses necessary for the government option of the social studies teaching major and for a political science minor as part of an M.A. program.

Majors

Students majoring in political science must complete at least 33 hours of course-work in the discipline, including:

1. At least one course in each of four of the five areas of political science. These five areas are:
   a. American political systems, processes, and behavior
   b. Comparative political systems, processes, and behavior
   c. International politics, organization, and law
   d. Political theory and methodology
   e. Public policy and processes
2. At least nine hours in one of the fours fields chosen.
3. At least 18 hours of the 33 hours of coursework above the 399 level.

Otherwise there are no specified course requirements for undergraduate political science majors, except in the form of suggested prerequisites for certain upper level courses.

Social Studies Teaching Major.

Subjects for the Endorsements are US History, European History, Sociology, Political Science, and Economics. Requirements for the teaching major are (1) completion of 18 to 21 hours in one of the endorsement subjects (courses are specified); (2) completion of a second endorsement of 15 hours (courses are specified); and (3) completion of a three-hour course in each of the remaining three endorsement subjects above. In addition to the major requirements, students are mandated to take courses required for teacher certification—education courses, social science courses and courses in science and mathematics.

UNDERGRADUATE LEVEL

HIST 102. INTRODUCTION TO WESTERN CIVILIZATION: THE ANCIENT WORLD. Class 3, cr. 3.

A survey of the history of the ancient world (ancient Near East, Greece, and Rome) from its origins in the immediate prehistoric period to its dismemberment in the early Christian era. Emphasis is placed upon the cultural contributions of the various peoples whose interaction laid the foundation for modern, western civilization. Designed to meet the needs of the beginning student of European and world history.

HIST 103. INTRODUCTION TO WESTERN CIVILIZATION: THE MEDIEVAL WORLD. Class 3, cr. 3.

A survey of European history from the disintegration of the western Roman Empire through the age of expansion and discovery in the sixteenth century. Major emphasis is placed on those institutions and habits of thought peculiar to western Europe in the medieval era including feudal relations. Benedictine monasticism, the Papacy, the German Empire, and scholastic theology. Relevant contemporary developments in the Byzantine and Islamic worlds, however, are also studied. Designed to meet the needs of the beginning student in European history.

HIST 104. INTRODUCTION TO WESTERN CIVILIZATION: THE MODERN WORLD. Class 3, cr. 3.

Traces the expansion of Europe into the Americas, Africa, and Asia. The French Revolution, nationalism, and the development of western European states from the era of the Reformation to the present are studied.

HIST 151. AMERICAN HISTORY TO 1877. Class 3, cr. 3.

A study of the development of American political, economic, and social institutions from the later Colonial era to the end of Reconstruction.

HIST 152. UNITED STATES SINCE 1877. Class 3, cr. 3.

A study of the growth of the United States from 1877 to the present. The new industrialism, agrarian problems, depression, the New Deal, the two world wars,

the cold war, and similar topics are analyzed.

HIST 245. ISLAMIC CIVILIZATION: A HISTORICAL AND CULTURAL SURVEY. Class 3, cr. 3.

A survey of the civilization of the Middle East from the rise of Islam to the present. The political, social, and cultural institutions are examined along with the problem of adjusting these to the pressure of western civilization in the last two centuries.

HIST 271. LATIN AMERICAN HISTORY TO 1824. Class 3, cr. 3.

A survey of Latin American history from its origins to the end of the major movements to independence, with emphasis on discovery, colonization, expansion, and the transfer of institutions from Spain and Portugal.

HIST 272. LATIN AMERICAN HISTORY FROM 1824. Class 3, cr. 3.

A survey of Latin American history from independence to the present with particular attention on political, economic, and social problems connected with modernization.

HIST 328. ENGLISH HISTORY TO 1688. Class 3, cr. 3.

This course is designed to survey the growth and development of English society from its beginning through the seventeenth century. Emphasis is put upon those institutions and events that influenced the establishments of the English legal system.

HIST 329. ENGLISH HISTORY SINCE 1688. Class 3, cr. 3.

A continuation of HIST 328. Emphasis is placed upon Great Britain as a world and imperial power. Attention is given particularly to the industrial revolution, the growth and achievements of democratic institutions, and the role Britain has played in western civilization in recent times.

HIST 331. STUDIES IN EUROPEAN BIOGRAPHY. Class 3, cr. 3. (May be repeated for credit.)

A series of biographical sketches of the most distinguished Europeans in all fields of activity. In each semester a different period of modern European history is considered.

HIST 333. SCIENCE AND TECHNOLOGY IN WESTERN CIVILIZATION I. Class 3, cr. 3.

A survey of some of the main features of the historical development of science and technology, primarily in the western world, from the dawn of civilization up to Isaac Newton. Emphasis is placed upon the interaction between science, technology, and the societies which encourage or abridge them.

HIST 334. SCIENCE AND TECHNOLOGY IN WESTERN CIVILIZATION II. Class 3, cr. 3.

A survey of some of the main features of the historical development of science and technology in the western world from Newton to the present. Emphasis is placed upon the relation between the achievements of individual investigators and the major aspects of the society and culture in which they lived.

HIST 376. HISTORY OF INDIANA. Class 3, cr. 3.

Economic, political, and social history of Indiana from the state's earliest beginnings as a part of the old Northwest Territory to the present.

HIST 381. AMERICAN HISTORICAL BIOGRAPHY. Class 3, cr. 3.

Biographical studies of leaders in American life.

HIST 382. AMERICAN CONSTITUTIONAL HISTORY. Class 3, cr. 3.

Survey of the fundamental principles of American constitutionalism, and dominant trends in judicial interpretation, from the creation of the Constitution to the period of the New Deal.

HIST 397. THE AFRO-AMERICAN. Class 3, cr. 3.

A survey of the history of Afro-Americans in the United States from their African background to the present. Emphasis is placed upon the changing economic, social, and political status of Afro-Americans in the United States, and upon their contributions to American society.

(General prerequisite for all history courses numbered from 400 to 499: sophomore standing or consent of instructor.)

HIST 403. EUROPE IN THE REFORMATION. Class 3, cr. 3.

A study of decay and renewal in European society, 1300 to 1650. Primary attention is given to the Reformation (Protestant and Catholic) of the sixteenth century—seen as the culmination of revolts against the synthesis of the High Middle Ages. Consideration is also given to Christian Humanism, the European economy, exploration and discovery in the New World, and to the Wars of Religion.

HIST 461. THE REVOLUTIONARY ERA, 1763 TO 1800. Class 3, cr. 3.

An analysis of the origins, nature, and consequences of the American Revolution; of the achievements and difficulties of the new nation under the Articles of Confederation; of the drafting and adoption of the Constitution; and of the initial political, economic, and social progress of the United States under the Federalists.

HIST 472. MEXICO. Class 3, cr. 3.
History of Mexico from the Pre-Columbian period to the present time.

HIST 493. INTERDISCIPLINARY UNDERGRADUATE SEMINAR. Class 1-3, cr. 1-3. (Same as PHIL 493, POL 493, PSY 493, SOC 493, and THTR 493). (May be repeated for credit.)
An undergraduate seminar devoted to an interdisciplinary examination of social, economic, political, and intellectual movements, using the faculty resources of the participating departments. Subject matter will vary. Each offering of the seminar will be approved by a committee of department heads from the sponsoring departments.

HIST 494. SCIENCE AND TECHNOLOGY IN AMERICAN CIVILIZATION. Class 3, cr. 3.
A survey of the main features of the historical development of science and technology in the United States, particularly in the last century. Emphasis is placed upon the characteristic features of developments in the United States in contrast to those in Europe, and on the influence of science and technology on American thought, society, and material culture.

HIST 496. THE HISTORY OF THE LIFE SCIENCES IN SOCIETY. Class 3, cr. 3.
A study of major advances in biology and medicine. Particular attention is focused on major revolutions in scientific thought and their impact on society, as well as their critical reception in scientific, intellectual, and religious circles.

DUAL LEVEL
Undergraduate-Graduate

(General prerequisite for all history courses numbered from 500 to 599; junior standing or consent of instructor.)

HIST 510. THE AGE OF ABSOLUTE MONARCHY, 1600-1789. Class 3, cr. 3.
The Age of Absolute Monarchy, the first in a four-course sequence dealing with Modern Europe, will study that epoch, which can be identified as a transitional unit between the Reformation and the great revolutionary upheavals of the late eighteenth century. The major theme of the period 1600-1789 is the struggle between the dynastic establishment and those forces which sought to alter and eventually overthrow it. The course will also explore the decline of the Holy Roman Empire, Sweden, Poland, and the Ottoman Empire, and analyze those factors which contributed to the rise of Austria, Prussia, and Russia. Considerable attention will be devoted to the nature of enlightened despotism in these states and to the impact which enlightened thought had on the Old Regime in France. This course, and the others in the sequence, will enable the student to appreciate the panorama of ideas, events, and personalities which contributed a rich intellectual and political heritage to western civilization.

HIST 511. ENGLAND UNDER THE TUDORS. Class 3, cr. 3.
A study in depth of English society, 1485 to 1603. Special consideration is given to the "Tudor revolution in government," the English Reformation, the growth of Parliament, and the social and economic problems which beset England during the era of European expansion into the New World.

HIST 512. ENGLAND UNDER THE STUARTS. Class 3, cr. 3.
An intensive study of England during the period 1603 to 1689. The course begins by analyzing the political, economic, and religious tensions in English society under James I, and their aggravation during the reign of his son Charles I. The major focus of the course is the period 1640 to 1660: the Puritan Revolution, the Commonwealth, and the Protectorate of Oliver Cromwell. Lectures and readings analyze the causes of the revolution, the parties involved and their conflicting aims, the ferment of ideas (as seen in the works of men like Harrington, Hobbes, and Milton), and the problem of the degree to which the revolution was indeed revolutionary. The course concludes with a study of the Restoration, and of the Glorious Revolution of 1688-89: the denouement of this period of turmoil.

HIST 513. MODERN EUROPE, 1789-1850. Class 3, cr. 3.
This course, the second of a four-course sequence on the history of modern Europe, will focus on the major themes of the era 1789-1850: the French Revolution,

the ascendancy of France in Europe, and the reaction to that hegemony; the beginning of machine industry, and the social, political, and ideological consequences; the widespread revolutions of 1848. The careers of outstanding and influential individuals, as well as social movements and their interaction with those individuals, will be examined. Attention will also be paid to the continuity of historical development by relating these themes to earlier stages in the growth of European civilization.

HIST 514. A HISTORY OF WESTERN THOUGHT I. Class 3, cr. 3.

A survey of the intellectual and cultural development of the western world to the end of the Middle Ages.

HIST 515. A HISTORY OF WESTERN THOUGHT II. Class 3, cr. 3.

Continues HIST 514 from the Renaissance to the present.

HIST 521. PROBLEMS IN HISTORY OF GREAT BRITAIN, NINETEENTH CENTURY. Class 3, cr. 3.

An intensive study of problems in the social, economic, political, and cultural growth of the peoples of Great Britain.

HIST 522. PROBLEMS IN HISTORY OF GREAT BRITAIN, TWENTIETH CENTURY. Class 3, cr. 3.

Review and evaluation of the social, political, economic, and military changes in the domestic and foreign history of Great Britain from 1901 to the present.

HIST 525. PROBLEMS IN TWENTIETH-CENTURY GERMAN HISTORY. Class 3, cr. 3

A study in depth of three major periods of German history in this century: pre-1914, the Weimar Republic, and the Third Reich. Emphasis is placed on the transformation which occurred in German society as a result of the upheavals of this century.

HIST 528. EUROPEAN INTERNATIONAL RELATIONS AND POWER POLITICS. 1648-1815. Class 3, cr. 3.

A study of European political power relations in the Age of Absolutism, the French Revolution and Napoleon. Emphasis is upon foreign policy and diplomacy of the principal powers.

HIST 529. EUROPEAN INTERNATIONAL RELATIONS AND POWER POLITICS SINCE 1815. Class 3, cr. 3.

Continuation of HIST 528. Emphasis is upon the impact of ideological factors in European power politics in the 19th and 20th centuries.

HIST 535. MODERN EUROPE, 1850-1914. Class 3, cr. 3.

This course is the third segment of the sequence on the history of modern Europe. The period to be covered in this course are those years which are regarded as the zenith of European civilization: 1850-1914. The structure is both chronological and topical. In addition to an examination of the political development of the European states, specific topics such as science and the arts, industrialization, the major ideologies and social movements, imperialism, and international diplomacy will be discussed.

HIST 538. SOCIAL AND CULTURAL HISTORY OF MODERN RUSSIA. Class 3, cr. 3.

A survey of present day Soviet Russia since 1914. Included are accounts of its people, culture, economic resources, political institutions, international relations, and operation of its economic system.

HIST 552. EUROPE SINCE 1914. Class 3, cr. 3.

This course will concentrate on political, social, economic, and intellectual legacies of the two world wars. Special emphasis will be placed upon the structure of peace and security after 1919 and the dictatorships, Bolshevik Russia, Fascist Italy, and Nazi Germany. Another object of the course will be to show how the break-up of the Hapsburg monarchy led to the creation of a power vacuum in Eastern Central Europe which Nazi and Soviet imperialism filled in succession during the critical period 1938-1948, thereby terminating Western influence in that part of the Continent. After examining the Cold War and the revolts against Soviet rule in Hungary and Czechoslovakia, the course will conclude with an assessment of the present status of East-West relations.

HIST 553. COLONIAL AMERICA, 1600-1776. Class 3, cr. 3.

A study of the expansion of Europe, the age of exploration and discovery, and the establishment of colonies in the New World. Particular attention will be paid to the emergence of an American culture during the seventeenth and eighteenth centuries, the nature of the British Empire, and the emergence of dissent and revolution. This course is the first part of a five-part upper-level overview of American history.

HIST 554. THE ERA OF SECTIONALISM, 1820-1865. Class 3, cr. 3.

Third in a five-part overview of American history, this course will concentrate on the rise to domination of those forces and factors that led to a disastrous Civil War: slavery and antislavery, economic jostling among the sections, expansionism, the creation of false sectional stereotypes, and the rise of hostile sectional parties. The Civil War will be analyzed in military and political terms.

HIST 555. THE EMERGENCE OF MODERN AMERICA, 1865-1916. Class 3, cr. 3.

An examination of the nation that emerged emotionally exhausted from a civil war to become, by the eve of World War I, a land seemingly destined to achieve a degree of perfection not previously attained by the human community. The interaction of a flourishing industrial establishment, floods of immigrants, rapid urbanization, and smoldering racism combined to transform ante bellum America into a complex and relatively sophisticated society during those years. Emphasis will be placed upon an analysis of these forces and the men who tried to control them.

HIST 564. MODERN AMERICA, 1917-PRESENT. Class 3, cr. 3.

A history of the United States from the First World War to the present; the political, social, economic, diplomatic, and intellectual developments in America during those years will be examined in their world context.

HIST 569. HISTORY OF THE AMERICAN SOUTH. Class 3, cr. 3.

This course will stress those political and social traits that make the region between the Potomac and Rio Grande rivers a cultural province conscious of its identity. After the American Revolution there developed differences between the North and South so sharp as to constitute a Southern Way of Life and a Northern Way of Life. In offering this regional course it will be necessary to focus on those differences which made the South a unique region and the interrelations between the South and the nation of which it was a part. Half of the course will deal with the major events in the South's history after the Civil War, especially dealing with industry, agriculture, and the rise and fall of Jim Crow.

HIST 570. HISTORY OF UNITED STATES-LATIN AMERICAN RELATIONS. Class 3, cr. 3.

A survey of United States-Latin American relations from the time of Latin American independence to the present, with emphasis on the twentieth century. Examination of the goals, methods, and effects of the policy of the United States toward its southern neighbors.

HIST 575. THE AMERICAN FRONTIER. Class 3, cr. 3.

This course will involve study of the nature and importance of the westward movement in American history from the Revolution to the twentieth century. The westward movement will be treated in its varied aspects. Emphasis will be placed upon social and economic aspects as well as upon the spread of government. Efforts will be made to view this national expansion from the viewpoint of Americans exploiting a great land, offering vast resources, and the effects these resources had upon American development. Although the Turner thesis will be discussed, no attempt will be made to pursue a thesis.

HIST 577. CONTEMPORARY LATIN AMERICA. Class 3, cr. 3.

A topical and regional approach to recent political, social, and economic movements in Latin America.

HIST 578. COLONIAL LATIN AMERICA. Class 3, cr. 3.

A study of the discovery and exploration, the political, economic, and social institutions, and the movement to independence in Spanish and Portuguese colonial America.

HIST 579. NATIONAL LATIN AMERICA. Class 3, cr. 3.

The political, social, cultural, and economic history of modern Latin America from the movement toward independence to the present time. A detailed examination of the struggle for political stability and maturity with special emphasis on the complex problems facing Latin America in the twentieth century.

HIST 582. THE ART OF HISTORY. Class 3, cr. 3.

This course or its equivalent is required of undergraduate history majors and master's candidates at the Calumet Campus.

A balanced presentation of the art of studying, understanding, researching, and writing history. Taught by the section, it will present a balanced view of problems in American and European historiography; causalty and methodology will be emphasized. Careful attention will be paid to research methods, the mechan-

ics of citation, the use of the University library, and writing style.

HIST 584. SOCIAL HISTORY OF THE UNITED STATES. Class 3, cr. 3.

A survey of the social and cultural development of the American people since the late eighteenth century.

HIST 585. AMERICAN LABOR HISTORY. Class 3, cr. 3.

A chronological survey of American working class society, the growth of worker organizations, and the movement toward massive labor organization as a distinctive national development. Changing philosophies are examined, and the resulting pattern of relationship between management, the federal government, and the labor movement is emphasized.

HIST 586. UNITED STATES FOREIGN AFFAIRS TO 1900. Class 3, cr. 3.

An examination of United States relationships with the rest of the world from the colonial period to the end of the nineteenth century, viewed in perspectives of national development and international politics. Changes in policy and its ideological expression are analyzed, reflecting the drive for territorial expansion, the shifting focus of domestic political concerns, and the altered power position of the United States by the beginning of the twentieth century.

HIST 587. TWENTIETH-CENTURY UNITED STATES FOREIGN AFFAIRS. Class 3, cr. 3.

The course of the foreign policy followed by the United States as a great power is charted from the demand for expansion at the term of the century to the demand for a reduction of commitments today. Analysis is focused upon the interaction of traditional American ideals, changing national interests, and unprecedented developments on the international scene that have produced the fluctuating goals and uneven success characterizing American's foreign affairs during the period of her greatest power.

HIST 589. HISTORY OF RELIGION IN AMERICA. Class 3, cr. 3.

A historical examination, from colonial beginnings to the present, of American religions and their role in the social, political, and economic life of the nation, including a survey of the speculative theories, the institutional forms, and the artistic and emotional expressions of religion which have developed in the United States.

HIST 590. DIRECTED READING IN HISTORY. Cr. 1-3. (May be repeated for credit.)

A reading course directed by the instructor in whose particular field of specialization the content of the reading falls. Approval of each reading project must be secured from the department.

HIST 592. EARLY AMERICAN INTELLECTUAL HISTORY. Class 3, cr. 3.

A survey of American political, economic, philosophical, and religious thought beginning with thee European backgrounds of American Puritanism and concluding with the rise of Darwinian naturalism.

HIST 593. TWENTIETH-CENTURY AMERICAN INTELLECTUAL HISTORY. Class 3, cr. 3.

A survey of the origins and development of modern American thought. Early American religious and philosophical traditions, Darwinian evolution and evolutionary naturalism, pragmatism, and the main intellectual currents of the 1920s and the 1930s are considered.

HIST 596. THE AMERICAN CITY. Class 3, cr. 3.

A survey of urban development in the United States from the early colonial towns to the twentieth-century megalopolis. Emphasis is placed on the city as a particular geographic, economic, political, social, and cultural entity, and on its expanding role in American life.

HIST 597. PROBLEMS IN TWENTIETH-CENTURY BLACK AMERICA. Class 3, cr. 3.

An examination of major topics in twentieth-century Black history. The topics will be developed chronologically.

HIST 599. TEACHING BLACK HISTORY IN THE SCHOOLS. Class 3, cr. 3.

An overview of the major forces and events that have shaped the lives of Black Americans, closely integrated with a detailed analysis of important teaching methods, approaches, and audio-visual aids, this course is aimed at teachers and prospective teachers. Its goals are two: to re-educate the teacher of American history toward a more balanced outlook, and to acquaint teachers of Black history with pivotal facts and interpretations of the American Black experience.

GRADUATE LEVEL

HIST 601. READING SEMINAR IN EUROPEAN HISTORY. Sem. 1 and 2. Cr. 1-3. Graduate standing. May be repeated for credit.

Bibliography and historiography of selected fields or topics in European history; may vary in subject matter from semester to semester.

HIST 603. SEMINAR IN EUROPEAN HISTORY: RENAISSANCE AND REFORMATION. Sem. 2. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study directed toward topics of particular interest in the history of a European nation or region during the period of the Renaissance and Reformation.

HIST 605. SEMINAR IN EUROPEAN HISTORY: THE AGES OF ABSOLUTISM, ENLIGHTENMENT, AND REASON. Sem. 2. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study is directed toward topics of particular interest in the history of a European nation or region during the ages of Absolutism, Enlightenment, and Reason.

HIST 607. SEMINAR IN EUROPEAN HISTORY: FRENCH REVOLUTION AND NINETEENTH CENTURY. Sem. 1. Cr. 3. Admission by consent of instructor.

Individual and group study directed toward topics of particular interest in the history of a European nation or region during the period from 1789 to 1900.

HIST 609. SEMINAR IN EUROPEAN HISTORY IN THE TWENTIETH CENTURY. Sem. 1. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study directed toward topics of particular interest in the history of a European nation or region during the period since 1900.

HIST 611. SEMINAR IN THE POLITICAL AND CONSTITUTIONAL HISTORY OF EUROPE. Sem. 1. Cr. 3. Admission by consent of instructor. May be repeated for credit.

This course directs attention to a variety of topics dealing with the constitutional structure and political institutions of the European states in the nineteenth and twentieth centuries. Emphasis is placed on individual research and training in the methods and materials most useful for this area of research.

HIST 651. READING SEMINAR IN AMERICAN HISTORY. Sem. 1 and 2. Cr. 1-3. Graduate standing. May be repeated for credit.

Bibliography and historiography of selected fields or topics in American history; may vary in subject matter from semester to semester.

HIST 653. SEMINAR IN AMERICAN COLONIAL HISTORY AND THE AMERICAN REVOLUTION. Sem. 1. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study of selected topics in American history from the first European colonization through the American Revolution.

HIST 655. SEMINAR IN AMERICAN HISTORY: THE NATIONAL PERIOD TO 1850. Sem. 1. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study of selected topics in American history from the early National Period to 1850.

HIST 657. SEMINAR IN AMERICAN HISTORY: 1850 TO WORLD WAR I. Sem. 2. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study of selected topics in American history from the mid-nineteenth century to the end of the World War I period.

HIST 659. SEMINAR IN AMERICAN HISTORY: WORLD WAR I TO THE PRESENT. Sem. 2. Cr. 3. Admission by consent of instructor. May be repeated for credit.

Individual and group study of selected topics in American history from World War I to the present.

HIST 661. SEMINAR IN U.S. FOREIGN AFFAIRS AND NATIONAL SECURITY POLICY. Sem. 2. Cr. 3. Admission by consent of instructor. May be repeated for credit.

A series of studies in depth based upon individual research and group study of selected topics relating to foreign affairs, military affairs, and defense policies of the United States from the Revolution to the present.

POLITICAL SCIENCE

UNDERGRADUATE LEVEL

POL 100. THE POLITICS OF CHANGE. Class 4, cr. 3.

An introductory survey of the political forces at play in the processes of social, economic, and political change. Among topics to be considered are the politics of: the post-industrial revolution, environmental control, civil rights, the role of women in society, international cooperation and conflict. Emphasis will be placed on the political forces and processes involved in change and the resultant public policies.

POL 101. AMERICAN GOVERNMENT AND POLITICS. Class 3, cr. 3.

A study of the nature of democratic government, the U.S. Constitution, federalism, civil rights, political dynamics, the presidency, Congress, and the judiciary.

POL 141. INTRODUCTION TO COMPARATIVE POLITICS. Class 3, cr. 3.

Introductory survey of major foreign governments, including the governments of a western democracy, a communist state, and a developing country, with special attention to the historical, cultural, and constitutional development, the organization and ideologies of political parties, and current political problems.

POL 201. INTRODUCTION TO PUBLIC POLICY. Class 3, cr. 3.

Analysis of public policy in areas such as education, civil rights, taxation, health and safety, crime, military spending, poverty, welfare, urban affairs, pollution, consumer protection, and the economy. Various approaches to policy analysis will also be considered.

POL 230. INTRODUCTION TO INTERNATIONAL RELATIONS. Class 3, cr. 3.

An analysis of the fundamentals of international law, organization, and politics particularly as relevant to contemporary international relations.

POL 300. INTRODUCTION TO POLITICAL ANALYSIS. Class 3, cr. 3.

An introduction to the study of politics, its basic concepts and major areas of concern; also review of important research techniques, including methods of data collection and analysis.

POL 350. INTRODUCTION TO POLITICAL THEORY: CONCEPTS AND PROBLEMS. Class 3, cr. 3.

An introduction to the concepts employed by political theorists and the problems which they treat. Significant interpretations of such concepts as liberty, equality, representation, power, authority, rights, public interest, and justice. Treats methods of critical thought as well as substantive concern.

POL 351. INTRODUCTION TO POLITICAL THEORY: SCHOOLS OF POLITICAL THOUGHT. Class 3, cr. 3.

An introduction to the problems of comprehensive theorizing and the interrelation of concepts in political theory. Treats systems of political theory such as idealism, utilitarianism, Thomism, pragmatics, Maxsism, Platonism, and realism.

POL 370. INTRODUCTION TO COMPARATIVE STATE POLITICS. Class 3, cr. 3.

An introduction to the structure and process of state government, including the legal and political relationships between the state and local units of government.

POL 371. INTRODUCTION TO COMPARATIVE URBAN POLITICS. Class 3, cr. 3.

The politics of governing urban areas, including the selection of political leaders, and citizen participation in the decision making of the central city. Special attention will be given to the integration of minorities into the political and social life of the city.

POL 380. THE POLITICS OF BUREAUCRACY. Class 3, cr. 3.

Organization, functions, and principles of public administration, and its relationship to other branches of the government.

POL 404. DEMOCRATIC ELITISM. Class 3, cr. 3.

The role of political elites in a democracy, including consideration of alternative modes of recruitment, circulation, and accountability as viewed by Mills, Mosca, Pareto, and other elite theorists. Focus on how political elites can strengthen or threaten the functioning of democracy in modern American society.

POL 429. CONTEMPORARY POLITICAL PROBLEMS. Class 3, cr. 3. (May be repeated for credit from a different instructor.)

Contemporary political problems in the United States affecting the interpretation of democracy, human rights and welfare, social pressures, and intergovernmental relations.

POL 433. INTERNATIONAL ORGANIZATION. Class 3, cr. 3. Prerequisite: POL 230 or consent of instructor.

A study of the structure and functions of the United Nations and associated agencies with an emphasis on the role of this system in contemporary international relations.

POL 435. INTERNATIONAL LAW. Class 3, cr. 3. Prerequisite: POL 230 or consent of instructor.

A study of international legal theories, principles, and practices with an emphasis on the role and utility of law in contemporary international relations.

POL 439. UNITED STATES FOREIGN POLICY MAKING. Class 3, cr. 3. Prerequisite: POL 230 or consent of instructor.

An analysis of the decision-making process in United States foreign policy.

POL 442. THE SOVIET POLITICAL SYSTEM. Class 3, cr. 3. Prerequisite: POL 141 or 303, or consent of instructor.

Analysis of Russian political culture and the Russian political tradition. History, organization, and functioning of the Communist Party and the governmental apparatus. The role of the "social organizations," interest groups, and elites. Models of the Soviet political system.

POL 454. SELECTED PROBLEMS IN MATERIALIST POLITICAL THOUGHT. Class 3, cr. 3. (May be repeated for credit.)

Discussion and analysis of representative works and major schools of political theory which take a materialistic or naturalistic approach to the description and evaluation of political phenomena, e.g., the thought of Hobbes or of Marx, or psychoanalytic theories of politics. Emphasizes textural analysis and logical structure of the works examined and considers their applicability to contemporary political life.

POL 493. INTERDISCIPLINARY UNDERGRADUATE SEMINAR. Class 1-3, cr. 1-3. (Same as HIST 493, PHIL 493, PSY 439, SOC 493, and THTR 493.) Prerequisite: consent of instructor. (May be repeated for credit.)

An undergraduate seminar devoted to an interdisciplinary examination of social, economic, political, and intellectual movements, using the faculty resources of the participating departments. Subject matter will vary. Each offering of the seminar will be approved by a committee of department heads from the sponsoring departments.

DUAL LEVEL
Undergraduate-Graduate

POL 500. POLITICAL SCIENCE: SCOPE AND EMPIRICAL THEORIES. Class 3, cr. 3. Prerequisites: six hours of political science and consent of instructor.

An exploration of the scope of political science and of its development as a profession, followed by an analysis of major approaches to the study of politics and of current developments in empirical political theory.

POL 501. POLITICAL SCIENCE: METHODOLOGY. Class 3, cr. 3. Prerequisites: six hours of political science and consent of instructor.

Introduction to the basic techniques of statistical analysis applicable to political science data. Elementary descriptive statistics and statistical inference. Introduction to multivariate analysis.

POL 502. PHILOSOPHY OF POLITICAL INQUIRY. Class 3, cr. 3.

Intensive analysis of various philosophical problems in political inquiry. Special emphasis is given to problems in the philosophy of science, meta-ethics and analytic value theory, sociology of knowledge, ontology and metaphysics, and conceptualization of political language.

POL 510. POLITICAL PARTIES AND POLITICS. Class 3, cr. 3. Prerequisite: junior standing or above.

A study of political leadership, pressure groups, political parties, nominating processes, campaign strategies, voting behavior, and money in elections.

POL 511. CONGRESS: STRUCTURE AND FUNCTIONING. Class 3, cr. 3. Prerequisite: junior standing or above.

A study of the legislative, investigative, supervisory, and other major functions of Congress—with emphasis on how Congress actually operates and its relations with other parts of our political system.

POL 514. THE PRESIDENT AND THE POLICY PROCESS. Class 3, cr. 3. Prerequisite: POL 101, 301, or equivalent.

A study of presidential leadership as the embodiment of social forces and as reflective of the personality of the incumbent; the president as national leader reflecting national myths and ideologies;

the growth of the presidency; issues and forces affecting the continuity of presidental leadership; degree of institutionalization of the presidency.

POL 515. PUBLIC OPINION: FORMATION AND DYNAMICS. Class 3, cr. 3. Prerequisite: POL 101 or 301, or consent of instructor.

Introductory course on public opinion analysis, dealing with the properties of public opinion, the formation of attitudes and the changes in them, and the effects of these processes on political institutions and actors (e.g., the presidency, Congress, pressure groups, political parties, candidates). Basic introduction into the methodology of polling and survey research.

POL 516. GROUP POLITICS AND THE BLACK POWER MOVEMENT. Class 3, cr. 3. Prerequisite: POL 101 or 301.

A study based upon the assumption of the existence of a pluralistic society in which individuals sharing common interests are organized into groups for the promotion of those interests. Within the context of group organization, coalition, and contention, the phenomena of politics, government, and law are examined.

POL 523. ENVIRONMENTAL POLITICS AND PUBLIC POLICY. Class 3, cr. 3.

An examination of the political problems of natural resource use and environmental problems in the United States. Particular consideration is given to the importance of resources for American society, to control the environment by the government, and to the legal aspects of public policy.

POL 530. THEORIES OF INTERNATIONAL RELATIONS. Class 3, cr. 3. Prerequisite: POL 230 or consent of instructor.

An introduction to international relations theories, methods, and approaches.

POL 532. SELECTED PROBLEMS IN INTERNATIONAL RELATIONS. Class 3, cr. 3. Prerequisite: POL 230 or consent of instructor. (May be repeated for credit.)

An in-depth analysis of selected problems in international relations.

POL 539. SELECTED PROBLEMS IN UNITED STATES FOREIGN POLICY. Class 3, cr. 3. Prerequisite: POL 439 or consent of instructor.

An intensive study of several problems of United States foreign policy.

POL 542. COMMUNIST POLITICAL SYSTEMS. Class 3, cr. 3. Prerequisite: POL 442 or equivalent, or consent of instructor.

Advanced study of selected problems in the politics of Communist countries. The course will focus on such issues as the nationalities problem, political dissent, and opposition in the USSR and other Communist countries; the role of elites and interest groups within the context of a single-party system; as well as specific functions of the ruling Communist Party, e.g., indoctrination, leadership, and recruitment. The place of Communist studies in political science.

POL 550. REVOLUTION AND POLITICAL CHANGE. Class 3, cr. 3. Prerequisite: three hours of political science or consent of instructor.

Analysis of reformist and revoluntionary political movements in the United States with particular emphasis upon Black Power and student movements. Examination will include discussion of ideologies, normative theories, and strategies of change characteristic of these movements.

POL 560. CONSTITUTIONAL LAW. Class 3, cr. 3. Prerequisite: POL 101 or 301.

Leading constitutional decisions of the United States Supreme Court viewed against the background of history, economics, and politics.

POL 565. CURRENT POLITICAL IDEOLOGIES. Class 3, cr. 3. Prerequisite: POL 350.

Democracy, socialism, fascism, communism, and other political ideologies.

POL 570. SPECIAL PROBLEMS IN COMPARATIVE STATE POLITICS. Class 3, cr. 3. Prerequisite: POL 370.

The latest research into state politics will be the basis for intensive analysis of selected, processes and institutions. Individual research into areas of particular interest.

POL 571. SPECIAL PROBLEMS IN COMPARATIVE URBAN POLITICS. Class 3, cr. 3.

A study of the legal, political, and sociological characteristics of the municipality. Particular emphasis on the politics of urban America.

POL 590. DIRECTED READING IN POLITICAL SCIENCE. Cr. 1-3. (May be repeated for credit.)

A reading course directed by the instructor in whose particular field of specialization the content of the reading falls. Approval of each reading project must be secured from the department.

DEPARTMENT OF MODERN LANGUAGES

A. J. Lamb, Head

FACULTY: W. F. C. Ade, M. Bolduc, C. Hernandez, B. Kienbaum, A. Lamb, C. Ruiz and A. Russell

The Department of Modern Languages provides instruction in French, German, and Spanish leading to the undergraduate concentration in these languages and literatures, as well as the teaching of these languages. The specification of courses for the A.B. degree in German and in German Teaching is given below, and for the minor programs.

The study of these languages provides an ample basis for career development in teaching at all levels, as well as for unique opportunities in foreign service, diplomatic work, international business areas, government and United Nations translation and interpreting jobs, social and urban applications in several fields.

An increasing number of graduate-level courses in German, French and Spanish are intended, also, for refresher study or for credit to be used for an advanced degree. Additionally, we offer courses as a service for the fulfillment of foreign language requirements in other academic curricula.

The following exclude Core Requirements and Electives:

Modern Language Major

a. This major must be accompanied by a minor.

b. The following required courses:

260	Pronunciation	1 credit
261	Composition	3
360	Conversation	4
564	Linguistics	3
		11 credits

c. Fifteen credit hours from any combination of courses numbered 400 or higher ..... 15 credits

d. Six credit hours in another modern foreign language, not in the same language as the minor, if the minor is another language ..... 6 credits

Total required for major: 32

Modern Language Teaching Major

a. 203	Third Course	3 credits
204	Fourth Course	3
260	Pronunciation	1
261	Composition	3
360	Conversation	4
405	Intro. to Lit. I	3
406	Intro. to Lit. II	3
450	Civilization	3
562	Advanced Composition	
	or	
565	Advanced Conversation	3

564 Linguistics 3
552 Culture 3
Two literature courses at 500-level 6
One elective at 500-level 3

Total required for major ..... 41 credits

b. The Teaching Major must be accompanied by the following Education courses:

The first two taken prior to senior year:
Ed 285 Educational Psychology ..... 3 credits
Ed 304 Principles of Teaching 2
The next three taken in one semester of the senior year:
Ed 410 Methods of Teaching Foreign Languages in High School 3
Ed 424 Student Teaching 8
Ed 485 American School System 3

19 credits

Minor Requirements

The minor requirements are the same for any of the modern languages: 14 semester hours beyond the 204 course, including:

260 Pronunciation ..... 1 credit
261 Composition 3
360 Conversation 4
405 Lit. Survey I
or
406 Lit. Survey II 3
One other course numbered
400 or higher 3

14 credits

Teaching Minor Requirements

A Teaching Minor in any of the three languages will total 20 credit hours beyond 204, as follows:

260 Pronunciation ..... 1 credit
261 Composition 3
360 Conversation 4
405 Survey Lit. I 3
406 Survey Lit. II 3
One course from:
450 Civilization
552 Culture 3
One course from:
562 Adv. Composition
564 Linguistics
565 Adv. Conversation 3

20 credits

also: Ed 410 Methods of Teaching Foreign Language 3
Total for Teaching Minor ..... 23 credits

French

UNDERGRADUATE LEVEL

FR 101. FIRST COURSE IN FRENCH. Class 3, Lab. 1, cr. 3.

Introduction to the linguistic skills of French, based on a knowledge of language arts and intended to achieve an audio-lingual competence in French.

FR 102. SECOND COURSE IN FRENCH. Class 3, Lab. 1, cr. 3. Prerequisite: FR 101.

Continuation of FR 101.

FR 203. THIRD COURSE IN FRENCH. Class 3, cr. 3. Prerequisite: FR 102 or equivalent.

A conversational approach to the culture of France with a review of French language skills as needed.

FR 204. FOURTH COURSE IN FRENCH. Class 3, cr. 3. Prerequisite: FR 203 or equivalent.

Continuation of FR 203 and the presentation of intellectual readings.

FR 260. FRENCH PRONUNCIATION. Class 1, cr. 1. Prerequisite: FR 102 or equivalent.

The rudiments of phonetics as applied to the pronunciation of French. Practice in French pronunciation. May be taken concurrently with FR 203, 204, or 261. Required of majors and minors in French.

FR 261. FRENCH COMPOSITION. Class 3, cr. 3. Prerequisite: FR 203.

The essentials of French grammar as applied in composition. May be taken concurrently with FR 204. Required of majors and minors in French.

FR 330. MODERN FRENCH AUTHORS IN TRANSLATION. Class 3, cr. 3.

Reading and analysis of major French writers of the modern period with particular emphasis on the evolution of literary genres in relation to cultural, political, and social trends. Knowledge of French not required.

FR 360. FRENCH CONVERSATION. Class 3, Lab. 2, cr. 4. Prerequisite: FR 204.

Intensive practice in conversational French. Pattern practice, preparation and delivery of dialogues, and topical talks. Required of majors and minors in French.

FR 405. INTRODUCTION TO FRENCH LITERATURE I. Class 3, cr. 3. Prerequisite: FR 204.

Introduction to the periods of French literature from the beginning through the eighteenth century. Reading and discussion of representative works. The rudiments of literary criticism.

FR 406. INTRODUCTION TO FRENCH LITERATURE II. Class 3, cr. 3. Prerequisite: FR 204.

Introduction to the periods of French literature from the late Eighteenth century to the present time. Reading and discussion of representative works. The rudiments of literary criticism.

FR 450. FRENCH CIVILIZATION. Class 3, cr. 3.

The study of modern French life with emphasis on the customs and daily life of the people. Lectures in the language.

DUAL LEVEL
Undergraduate-Graduate

FR 510. THE CLASSICAL AGE. Class 3, cr. 3. Prerequisite FR 405.

The social background and the formation of classical traits of seventeenth century in France. Readings from Corneille, Racine, Moliere and minor authors.

FR 530. CONTEMPORARY FRENCH NOVEL Class 3, cr. 3. Prerequisite FR 406.

Contemporary novel as an insight into twentieth century French life. Analysis of works of selected authors.

FR 532. CONTEMPORARY FRENCH THEATRE. Class 3, cr. 3. Prerequisite: FR 406.

Readings and discussion of works in the twentieth-century theatre. Cocteau, Giraudoux, Montherlant, Claudel, Sartre, Camus, Anouilh, Ionesco, Beckett, Genet.

FR 552. FRENCH CULTURE. Class 3, cr. 3.

Development of the cultural life of the French people as reflected in architecture, art, history, literature, music, and philosophy. Lectures in French.

FR 562. ADVANCED FRENCH COMPOSITION. Class 3, cr. 3. Prerequisite: FR 261 or consent of instructor.

Additional training in writing French.

FR 564. FRENCH LINGUISTICS. Class 3, cr. 3. Prerequisite: FR 261.

Important principles of practical phonetics, phonemics, and the rudiments of phonology. Practical work in pronunciation and intonation.

FR 565. ADVANCED FRENCH CONVERSATION. Class 3, cr. 3. Prerequisite: FR 261.

Additional practice in speaking and understanding French. Talks based on material given in class.

GRADUATE LEVEL

FR 601. FIRST COURSE TO ESTABLISH READING KNOWLEDGE. Class 4, cr. 3. No prerequisite.

FR 605. SECOND COURSE TO ESTABLISH READING KNOWLEDGE. Class 4, cr. 3. (For those in the humanities and social sciences.)

German

UNDERGRADUATE LEVEL

GER 101. FIRST COURSE IN GERMAN. Class 3, Lab. 1, cr. 3.

Introduction to the linguistic skills of German, based on a knowledge of language arts and intended to achieve an audio-lingual competence in German.

GER 102. SECOND COURSE IN GERMAN. Class 3, Lab. 1, cr. 3. Prerequisite: Ger 101.

Continuation of GER 101.

GER 203. THIRD COURSE IN GERMAN. Class 3, cr. 3. Prerequisite: GER 102.

Readings from the works of nineteenth-century and contemporary German writers; practice in speaking and writing German.

GER 204. FOURTH COURSE IN GERMAN. Class 3, cr. 3. Prerequisite: GER 203 or equivalent.

A continuation of GER 203 and the presentation of intellectual readings.

GER 244. FOURTH COURSE IN SCIENTIFIC GERMAN. Class 3, cr. 3. Prerequisite: GER 203. Credit will not be given for both GER 204 and 244.

GER 260. GERMAN PRONUNCIATION. Class 1, cr. 1. Prerequisite: GER 102 or equivalent.

The rudiments of phonetics as applied to the pronunciation of German. Practice in German pronunciation. May be taken concurrently with GER 203, 204, or 261. Required of majors and minors in German.

GER 261. GERMAN COMPOSITION. Class 3, cr. 3. Prerequisite: GER 203.

The essentials of German grammar as applied in composition. May be taken concurrently with GER 204. Required of majors and minors in German.

GER 330. GERMAN LITERATURE IN TRANSLATION. Class 3, cr. 3.

Reading and analysis of selected German writers and their works with particular emphasis on the social, political, and intellectual climate of the times. The course content will change from semester to semester. Knowledge of German not required.

GER 360. GERMAN CONVERSATION. Class 3, Lab. 2, cr. 4. Prerequisite: GER 204.

Intensive practice in conversational German. Pattern practice, preparation and delivery of dialogues, and topical talks. Required of majors and minors in German.

GER 405. INTRODUCTION TO GERMAN LITERATURE I. Class 3, cr. 3. Prerequisite: GER 204.

Survey of German literature from the beginning through the eighteenth century. Reading and discussion of representative works and the fundamentals of literary criticism.

GER 406. INTRODUCTION TO GERMAN LITERATURE II. Class 3, cr. 3. Prerequisite: GER 405.

A continuation of GER 405 covering the basic German literature survey from the eighteenth century to the present time.

GER 450. GERMAN CIVILIZATION. Class 3, cr. 3.

The study of modern German life with emphasis on the customs and daily life of the people. Lectures in the language.

DUAL LEVEL
Undergraduate-Graduate

GER 515. THE AGE OF ENLIGHTENMENT AND THE STORM AND STRESS MOVEMENT. Class 3, cr. 3. Prerequisite: GER 405.

A study of the literature of the Age of

Enlightenment, the cult of feeling and the Storm and Stress works of Goethe and Schiller.

GER 519. GERMAN CLASSICISM. Class 3, cr. 3. Prerequisite: GER 406.

The study of the classical period in German literature as revealed in the works of Goethe and Schiller.

GER 520. GERMAN ROMANTICISM. Class 3, cr. 3. Prerequisite: GER 406.

A study of the rise and degeneration of the Romantic ideal in German literature. Particular attention is paid to the aesthetics, literary criticism, and the revival of a national heritage.

GER 522. GERMAN DRAMA FROM THE BEGINNING OF THE NINETEENTH CENTURY TO NATURALISM. Class 3, cr. 3. Prerequisite: GER 406.

A study of the most significant dramatists until the advent of naturalism.

GER 523. THE GERMAN NOVELLE. Class 3, cr. 3. Prerequisite: GER 406.

A survey of the development of the *Novelle,* a literary genre which presents Germany's unique contribution to the European literature of the nineteenth century.

GER 530. GERMAN PROSE FROM NATURALISM TO THE PRESENT. Class 3, cr. 3. Prerequisite: GER 406.

Development of the novel and short story of the period, with special emphasis on the major authors.

GER 532. GERMAN DRAMA FROM NATURALISM TO THE PRESENT. Class 3, cr. 3. Prerequisite: GER 406.

Development of the drama through the various literary movements of the period, including consideration of the underlying social and ideological forces.

GER 552. GERMAN CULTURE. Class 3, cr. 3.

The development of the cultural life in German-speaking lands as reflected in architecture, art, history, literature, music, and philosophy. Lectures in German.

GER 562. ADVANCED GERMAN COMPOSITION. Class 3, cr. 3. Prerequisite: GER 261 or consent of instructor.

Additional training in writing German.

GER 564. INTRODUCTION TO THE LINGUISTIC STUDY OF GERMAN. Class 3, cr. 3. Prerequisite: GER 261.

Important principles of practical phonetics, phonemics, and the rudiments of phonology. Practical work in pronunciation and intonation.

GER 565. ADVANCED GERMAN CONVERSATION. Class 3, cr. 3. Prerequisite: GER 261.

Additional practice in speaking and listening. Talks based on material given in class.

COURSES FOR GRADUATE READING KNOWLEDGE

GER 601. FIRST COURSE TO ESTABLISH READING KNOWLEDGE. Class 4, cr. 3. No prerequisite.

GER 603. SECOND COURSE TO ESTABLISH READING KNOWLEDGE. Class 4, cr. 3. (For those in the physical sciences, mathematics, and engineering.)

GER 605. SECOND COURSE TO ESTABLISH READING KNOWLEDGE. Class 4, cr. 3. (For those in the humanities and social sciences.)

Spanish

UNDERGRADUATE LEVEL

SPAN 101. FIRST COURSE IN SPANISH. Class 3, Lab. 1, cr. 3.

Introduction to the linguistic skills of Spanish, based on a knowledge of language arts and intended to achieve an audio-lingual competence in Spanish.

SPAN 102. SECOND COURSE IN SPANISH. Class 3, Lab. 1, cr. 3. Prerequisite: SPAN 101.

Continuation of SPAN 101.

SPAN 203. THIRD COURSE IN SPANISH. Class 3, cr. 3. Prerequisite: SPAN 102 or equivalent.

A conversational approach to the cultures of Spain and South America with a review of Spanish language skills as needed.

SPAN 204. FOURTH COURSE IN SPANISH. Class 3, cr. 3. Prerequisite: SPAN 203 or equivalent.

A continuation of SPAN 203 and the presentation of intellectual readings.

SPAN 260. SPANISH PRONUNCIATION. Class 1, cr. 1. Prerequisite: SPAN 102 or equivalent.

The rudiments of phonetics as applied to the pronunciation of Spanish. Practice

in Spanish pronunciation. May be taken concurrently with SPAN 203, 204, or 261. Required of majors and minors in Spanish.

SPAN 261. SPANISH COMPOSITION. Class 3, cr. 3. Prerequisite: SPAN 203.

The essentials of Spanish grammar as applied in composition. May be taken concurrently with SPAN 204. Required of majors and minors in Spanish.

SPAN 360. SPANISH CONVERSATION. Class 3, Lab. 2, cr. 4. Prerequisite: SPAN 204 or 264.

Intensive practice in conversational Spanish. Pattern practice, preparation and delivery of dialogues, and topical talks. Required of majors and minors in Spanish.

SPAN 405. INTRODUCTION TO SPANISH LITERATURE I. Class 3, cr. 3. Prerequisite: SPAN 204.

Introduction to the periods in Spanish literature from the beginning to the eighteenth century. Reading and discussion of representative works. The rudiments of literary criticism.

SPAN 406. INTRODUCTION TO SPANISH LITERATURE II. Class 3, cr. 3. Prerequisite: SPAN 204.

Introduction to the periods in Spanish literature from the eighteenth century to the present. Reading and discussion of representative works. The rudiments of literary criticism.

SPAN 451. SPANISH CIVILIZATION. Class 3, cr. 3.

The study of modern Spanish life with regard to the social institutions and customs. Lectures in the language.

DUAL LEVEL
Undergraduate-Graduate

SPAN 506. EARLY SPANISH PROSE FICTION. Class 3, cr. 3. Prerequisite: SPAN 405.

Readings and discussion of early fictional forms in Spain, including the picaresque, chivalric, Moorish, and sentimental novels.

SPAN 520. THE SPANISH NOVEL FROM REGIONALISM THROUGH THE GENERATION OF '98. Class 3, cr. 3. Prerequisite: SPAN 406.

The study of the nineteenth-century novel from the *costumbristas* to Galdós. The social and aesthetic preoccupations of the Generation of '98. Lectures and readings from representative authors.

SPAN 530. CONTEMPORARY SPANISH NOVEL. Class 3, cr. 3. Prerequisite SPAN 406.

The contemporary novel as an insight into twentieth century Spanish life and thought. Analysis of selected authors.

SPAN 550. LATIN AMERICAN CIVILIZATION. Class 3, cr. 3.

Outline of Latin American history; the cultural heritage from Spain and from the pre-Spanish civilizations; the intellectual, social, and cultural progress of the Latin American countries. Lectures in the language.

SPAN 552. SPANISH CULTURE. Class 3, cr. 3.

The development of the cultural life of the Spanish people, as reflected in the geography, history, music, art, and architecture of Spain. Lectures in Spanish.

SPAN 562. ADVANCED SPANISH COMPOSITION. Class 3, cr. 3. Prerequisite: SPAN 261 or consent of instructor.

Additional training in writing Spanish.

SPAN 564. SPANISH LINGUISTICS. Class 3, cr. 3. Prerequisite: SPAN 261.

The study of phonology, phonemics, and phonetics, as aids to an understanding of the development and present status of the language of the Spanish-speaking world. Practical work in pronunciation and intonation.

SPAN 565. ADVANCED SPANISH CONVERSATION. Class 3, cr. 3. Prerequisite: SPAN 261.

Additional practice in speaking and understanding Spanish. Talks based on material given in class.

DEPARTMENT OF SPEECH AND CREATIVE ARTS

Edwin Cohen, Head

FACULTY: K. P. Bacus, R. E. Caplan, Y. S. Chambers, E. Cohen, M. Dakich, M. E. Dixon, L. R. Goodman, B. R. Mangus, J. A. Mohamed, D. E. Simpson.

The Department of Speech and Creative Arts provides a broad spectrum of curricula and classes ranging from the behavioral sciences to performing and creative arts. From the selection of speech-communication, rhetoric, oral interpretation, radio and television, speech science, journalism, art and design, music, and theatre courses the student has the opportunity to choose a field of study for a liberal arts education, for professional training, for general humanitarian education, or for a creative, artistic supplement to his regular course of study.

The department offers the following curricula:

Speech Teaching Major

The Speech Teaching Major can be coupled with any minor and provides certification in Secondary Education in the state of Indiana.

Departmental requirements are as follow:

A. eighteen (18) hours of the following courses: COM 210, 231, 240, 318, 320, and 537;

B. six (6) hours in THTR 255 and 340;

C. six (6) hours in Audiology and Speech Science, AUS 210 and 301;

D. six (6) hours chosen from courses in oral interpretation of literature, public address, and theatre; and

E. six (6) hours of electives in English or the social sciences in courses numbered 300 or higher.

In addition to the forty-two (42) hours required by the department, there are the professional requirements of EDUC 285, 304, 418, 424, 485, and the methods class for the minor; at least fourteen (14) hours in mathematics and science; and fifteen (15) hours in social science, including PSY 120. The department recommends that the teaching major in speech be accompanied by a teaching minor.

Radio-Television-Film Major

This major must be accompanied by a minor.

Departmental requirements are as follow:

A. fifteen (15) hours in COM 231, 232, 330, 331, and 332;

B. three (3) hours chosen from COM 212, 318, 320, or 325;

C. twelve (12) hours chosen from COM 240, 252, 431, 432, 433, 530, 531, 532, 534, 536, 537, or ENGL 376.

General Speech Minor

The requirements for this minor are any twelve (12) hours taken from courses with a COM prefix.

Theatre Minor

The requirements for this minor are as follows:

A. nine (9) hours of THTR 255, 340, and 570 or 571;
B. at least five (5) hours of other courses with the THTR prefix.

Speech Teaching Minor

The requirements for this course are as follows:

A. three (3) hours chosen from COM 210, 314, 318, 320, and 414;
B. three (3) hours chosen from COM 231 or 537;
C. three (3) hours chosen from COM 240 or THTR 201;
D. three (3) hours chosen from AUS 210 or 301; and
E. twelve (12) hours chosen from any other courses with a COM prefix (except 114 and courses in journalism) including those listed above and/or courses with a THTR prefix.

In addition, EDUC 418 is required.

Elementary Education—Second Major

The requirements for this curriculum are as follows:

A. six (6) hours of COM 114 and ENGL 235 (satisfies core requirements);
B. nine (9) hours of COM 240, COM 320, and THTR 534;
C. nine (9) hours in *one* of the following areas:
   1. Public Address
   2. Radio and Television
   3. Oral Interpretation
   4. Theatre

Audiology and Speech Sciences

UNDERGRADUATE LEVEL

AUS 210. SPEECH CORRECTION. Class 3, cr. 3.
Nature, symptoms, and causes of communication disorders and the principal methods used for remediation.

AUS 301. PHONETICS: THEORY AND APPLICATION. Class 3, cr. 3.
Phonetic basis of speech sounds; broad transcription; standards which influence pronunciation, including observation and representation; ear training and practice in transcription.

Graduate Courses in Linguistics

AUSL 580. INTRODUCTION TO LINGUISTICS. Sem. 1 and 2. Class 3, cr. 3.
Basic concepts and methods involved in the description of natural languages.

AUSL 681. FIELD METHODS IN LINGUISTICS. Sem. 1 and 2. Class 3, Lab. 3, cr. 3. Admission by consent of instructor only.
Techniques in elicitation, collection, and analysis of language data.

Communication

UNDERGRADUATE LEVEL

COM 114. FUNDAMENTALS OF SPEECH COMMUNICATION. Class 3, cr. 3.
A study of communication theories as applied to speech; practical communicative experiences ranging from interpersonal communication and small group

process through problem identification and solution in discussion, to informative and persuasive speaking in standard speaker-audience situations.

COM 210. DEBATING PUBLIC ISSUES. Class 3, cr. 3. Prerequisite: COM 114.

Study of argumentation as applied to public discourse. Lectures on logic and reasoning, library research methods, and bibliography, identification and analysis of issues, construction and organization of cases, refutation and rebuttal, and the phrasing and delivery of the argumentative speech. Preparation of debate cases.

COM 211. PRACTICUM IN SPEECH COMMUNICATION ACTIVITIES. Lab. 2, cr. 1, or Lab. 4, cr. 2. Prerequisite: consent of instructor. (May be repeated for credit, maximum total four credits.)

Training in the theory and techniques of intercollegiate forensics, participation in competitive events, and public presentations.

COM 212. APPROACHES TO THE STUDY OF INTERPERSONAL COMMUNICATION. Class 3, cr. 3.

A study of basic characteristics of human communication and the theoretical and practical implications of these characteristics for various forms of oral communication.

COM 231. (formerly 250) MASS COMMUNICATION AND SOCIETY. Class 3, cr. 3.

A survey of the print, broadcast and film media in their relationship and influence on society. Study topics include: mass communication theories, documentaries, commercialism, news media, media effects and control, feedback, educational broadcasting, and audience analysis.

COM 232. RADIO AND TELEVISION PERFORMANCE. Class 1, Lab. 4, cr. 3. Prerequisite: COM 114 and 231 or consent of instructor.

Study and practice in radio and television communication, continuity, news, interview, discussion, music, commercials, drama; basic voice instruction and technical orientation.

COM 240. INTRODUCTION TO ORAL INTERPRETATION. Class 3, cr. 3. Prerequisite: COM 114.

Oral interpretation of prose, poetry, and dramatic dialogue based on careful study of meaning and emotional content.

COM 241. PRACTICUM IN ORAL INTERPRETATION. Lab. 2 or 4, cr. 1 or 2. Prerequisite: consent of instructor. (May be repeated for credit; maximum total four credits.)

Practical training and experimentation in individual and ensemble oral interpretation.

COM 252. NEWS REPORTING. Class 1, Lab. 4, cr. 3.

Style, news values, and story construction in newspaper writing. Extensive practice in writing various principal types of news stories for the American press. (Typing ability is highly desirable.)

COM 312. RHETORIC IN THE WESTERN WORLD: HISTORICAL PERSPECTIVES. Class 3, cr. 3. Prerequisite: COM 114 or equivalent.

A survey of major European rhetoricians, such as Aristotle and Quintilian, and speaking events from 500 B.C. to 1900 A.D. Speeches delivered in connection with the Athenian democracy, the fall of the Roman Republic, the Crusades, and the Reformation are analyzed. Rhetorical theory and oratorical practice are related to each other and to the social development of western civilization.

COM 314. ADVANCED PUBLIC SPEAKING. Class 3, cr. 3. Prerequisite: COM 114.

Development of a marked degree of skill in the composition and delivery of various types of speeches; special emphasis on speeches related to the student's major vocational area.

COM 315. SPEECH COMMUNICATION OF TECHNICAL INFORMATION. Class 3, cr. 3. Prerequisite: COM 114. Open only to students enrolled in the Departments of Technology.

The organization and presentation of information of a practical technical nature. Emphasis is placed upon the study, preparation, and use of audio-visual materials in such presentations.

COM 316. THE ROLE OF SPEAKING IN MAJOR AMERICAN CONTROVERSIES. Class 3, cr. 3. Prerequisite: COM 114 or 318 or consent of instructor.

Analysis of selected speeches and debates in major American controversies of social significance. Speeches are examined to locate value premises and persuasive techniques, leading to definitions of terms such as "free speech," "orator," and "demogogue."

COM 318. PRINCIPLES OF PERSUASION. Class 3, cr. 3. Prerequisite: COM 114 or consent of instructor.

Persuasion and its effects on behavior with emphasis on evidence and reasoning and on emotional and personal proof; practice in critical reception as well as effective composition of persuasive discourse.

COM 320. GROUP DISCUSSION AND CONFERENCE LEADERSHIP. Class 3, cr. 3. Prerequisite: COM 114.

A study of group thinking and problem-solving methods; participation in and evaluation of committee and informal discussion groups.

COM 323. BUSINESS AND PROFESSIONAL SPEAKING. Class 3, cr. 3. Prerequisite: COM 114.

The study of oral communication problems and responsibilities in the business-organizational environment. Participation in problem-solving from investigation and informative speaking to advocacy and parliamentary debate.

COM 325. INTERVIEWING: PRINCIPLES AND PRACTICE. Class 3, cr. 3. Prerequisite: COM 114.

Theory and practice of methods in selected interview settings: informational, employment, and persuasive. Emphasis on communication between two persons, questioning techniques, and the logical and psychological bases of interpersonal persuasion.

COM 330. THEORIES OF MASS COMMUNICATION. Class 3, cr. 3.

An examination of mass communication theories and theorists. Readings and discussion of McLuhan, Lippman, LaFleur, Lazarsfeld, Schramm, Stephenson, and other significant contributors.

COM 331. RADIO PRODUCTION. Class 1, Lab. 4, cr. 3. Prerequisites: COM 231 and consent of the instructor.

Basic principles of producing, directing, and writing for radio. Treats program types, production methods, techniques of the sound studio, principles of directing radio programs, and laboratory practice in production and direction.

COM 332. TELEVISION PRODUCTION. Class 1, Lab. 4, cr. 3. Prerequisites: COM 231 and consent of instructor.

Basic principles of producing, writing, and directing for television. Production and direction of television programs at the Purdue Television Unit. Treats program types and television criticism, and explores creative treatment of visual, artistic, and nonverbal elements of communication in television.

COM 333. FILM PRODUCTION. Class 2, Lab. 2, cr. 3. Prerequisites: COM 231 and consent of instructor.

Basic theory and techniques of motion picture production. Viewing and evaluation of films illustrating a variety of film techniques. Production experiences in filming, scripting, editing, sound recording, and production planning.

COM 340. ORAL INTERPRETATION OF POETRY. Class 3, cr. 3. Prerequisite: one of the following—COM 240, THTR 111, ENGL 237, 240, 241, 350, 351, or consent of instructor.

Textual and dramatistic approaches to the analysis and oral interpretation of narrative, lyric, dramatic, and didactic poetry of English and American poets. Emphasis on the oral reading techniques of communicating the meanings and emotions of poetry.

COM 341. ORAL INTERPRETATION OF PROSE. Class 3, cr. 3. Prerequisite: COM 240 or equivalent.

Approaches to the analysis and oral interpretation of prose: the essay, the speech, and, particularly, narrative fiction. Study in depth of selected prose periods, styles, and forms in preparation for performance.

COM 342. ORAL INTERPRETATION OF DRAMA. Class 3, cr. 3. Prerequisite: COM 240 or equivalent.

Approaches to the analysis and oral interpretation of dramatic forms: the play, the monologue, and dramatic dialogue. Study in depth of particular techniques of analysis and performance for selected dramatic forms.

COM 350. INTERRACIAL COMMUNICATION. Class 3, cr. 3. Prerequisites: COM 114 and consent of instructor.

Analysis of problems and solutions in interracial communication. Investigation of negative attitudes and other barriers impeding interethnic communication, especially between whites and blacks. Use of model communicative situations in interracial dialogue.

COM 352. NEWS LAW. Class 2, cr. 2. Prerequisite: junior standing or permission of instructor.

Study of Anglo-American traditions and trends, as well as current American con-

ditions of the law of libel, privacy, fair comment and criticism, privilege, property rights, and copyright. Emphasis is placed on existing state and federal regulations and precedents.

COM 355. FUNDAMENTALS OF ADVERTISING. Class 3, cr. 3. Prerequisite: COM 230 or 250, or consent of the instructor.

Theory and practice of advertising in the mass media, with emphasis on the newspaper and the magazine.

COM 357. HIGH SCHOOL PUBLICATIONS. Class 3, cr. 3.

Study of the functions, mechanics, and writing techniques of high school newspapers and yearbooks. A survey of editorials, business, and production aspects of student publications with some news writing assignments. Instruction in teaching high school journalism. Recommended for prospective teachers of English.

COM 415. DISCUSSION OF TECHNICAL PROBLEMS. Class 3, cr. 3. Prerequisite: COM 315. Open only to students in the Departments of Technology.

Principles of speech communication related to interpersonal and group discussions on technical topics and problems; practice in using these modes in situations typically encountered by the technologists.

COM 431. PRACTICUM IN RADIO. Class 1, Lab. 2, cr. 2. Prerequisites: COM 231 and consent of instructor. (May be repeated once only for credit.)

COM 432. PRACTICUM IN TELEVISION. Class 1, Lab. 2, cr. 3. Prerequisites: COM 231 and consent of instructor. (May be repeated once only for credit.)

Assigned television program production.

COM 433. PRACTICUM IN FILM. Class 1, Lab. 2, cr. 2. Prerequisites: COM 231 and consent of instructor. (May be repeated once only for credit.)

Assigned production in cinematography.

COM 452. PRACTICUM IN JOURNALISM. Class 1, Lab. 2, cr. 2. Prerequisites: COM 252 and consent of instructor.

Assigned projects in journalism.

DUAL LEVEL
Undergraduate-Graduate

COM 504. DEVELOPMENT AND PROBLEMS OF SPEECH EDUCATION. Class 3, cr. 3. Prerequisite: consent of instructor.

Study of the evolution of content and method in the teaching of speech from classical and European roots to the present; special attention to the influences of great teachers, schools, movements, books, and events.

COM 508. NONVERBAL COMMUNICATION IN HUMAN INTERACTION. Class 3, cr. 3. Prerequisite: consent of instructor.

An examination of theoretical writings and critical research studies in selected areas of nonverbal study—e.g., the environmental influences, space and territory relationships, physical behavior, and vocal cues. One unit will specifically concern itself with measurement, recording, or transcription methods used in nonverbal study.

COM 511. DEVELOPMENT AND DIRECTION OF FORENSIC PROGRAMS. Class 3, cr. 3. Intended primarily for advanced undergraduates and students pursuing master's degrees. Admission by consent of instructor.

Study of the philosophy and role of various forensic activities in speech education; recent trends and practices in cocurricular and extracurricular programs; critical evaluation of related research.

COM 512. THEORIES OF INTERPERSONAL COMMUNICATION. Class 3, cr. 3. Prerequisite: COM 212 or consent of instructor.

Review of contemporary theories, analysis of concepts, models, and pertinent research across the broad spectrum of interpersonal communication.

COM 514. THE RHETORIC OF CONFLICT AND COMPROMISE: HISTORICAL PERSPECTIVES. Sem. 1 or 2. Class 3, cr. 3. Prerequisite: COM 318 or consent of instructor.

An examination of the role persuasion has played historically as a means of reaching accommodation in times of social change. Includes case study examinations of how rhetorical behavior is used to define and arbitrate national and international differences. Attention is given to such topics as the American Rev-

olution, the Compromise of 1850, the Civil War, Imperialism, and the Arab-Israeli Conflict. Staff.

COM 519. THE RHETORIC OF AMERICAN AGITATION. Class 3, cr. 3.

An investigation of agitational rhetoric comprising social, political, and economic protest. Special emphasis is placed upon the rhetoric strategies of agitators, such as Samuel Adams, David Walker, Charles Redmond, Johann Most, William Lloyd Garrison, Abbie Hoffman, H. Rap Brown, Stokely Carmichael, and Malcolm X.

COM 530. BROADCAST JOURNALISM. Class 2, Lab. 2, cr. 3. Prerequisite: COM 231 or consent of instructor.

The history and practice of broadcast journalism, with group and individual projects in various forms of broadcast journalism: straight news, feature reports, commentary, editorial, interview, and documentary.

COM 531. PROBLEMS IN CONTEMPORARY BROADCASTING. Class 3, cr. 3. Prerequisites: COM 331 and consent of the instructor.

Critical analysis and evaluation of current and continuing social problems in both commercial and public broadcasting, with emphasis upon audience analysis and recent studies dealing with media effects.

COM 532. BROADCAST MANAGEMENT. Class 3, cr. 3. Prerequisites: COM 231 and consent of the instructor.

A study of problems of organization and management of radio and television stations—both commercial and public—with emphasis upon economic factors as well as on the interrelationships of various departments. Special problems related to programming, production, sales, public relations, CATV, audience, governmental regulation, current and future trends will be treated.

COM 534. COMPARATIVE BROADCAST SYSTEMS. Class 3, cr. 3. Prerequisite: COM 231 or consent of instructor.

Historical, sociological, and political aspects of various systems of broadcasting throughout the world. Examination of American, Canadian, British, French, German, Soviet, and other broadcast institutions to discover why and how they are regulated and what impact they have on political, social, and economic development.

COM 536. RADIO AND TELEVISION WRITING. Class 3, cr. 3. Prerequisites: COM 231 and consent of instructor.

Study of forms and materials suitable for both media; practice in selection, adaptation, and organization of special program materials; special uses of media in education.

COM 537. RADIO AND TELEVISION IN EDUCATION. Sem. 1. SS. Class 3, cr. 3. Admission by consent of instructor.

Survey of the educational and instructional applications of radio and television materials; analysis of selected problems in the educational uses of the media; analysis and application of production practices as related to the learning process.

COM 540. ADVANCED ORAL INTERPRETATION. Class 3, cr. 3. Prerequisite: COM 240 or equivalent.

Study and practice of the techniques of oral interpretation for public performances. Emphasis on analysis of materials, program building, and criticism. Consideration also given to utilizing oral reading techniques in the teaching of literature and speech at the secondary level.

COM 541. ENSEMBLE INTERPRETATION. Class 3, cr. 3. Prerequisite: COM 240 or equivalent.

A study of the history, theories, and styles of group oral presentation of literature including fictional, dramatic, nonfictional, and thematic subjects. Emphasis is placed on experimentation in the styles of presentation and on the development of analytical insights into the various literary forms.

COM 542. ORAL INTERPRETATION OF ELIZABETHAN LITERATURE. Class 3, cr. 3. Prerequisite: COM 240 or equivalent.

A study of the language, styles, and forms of Elizabethan literature for oral presentation. Analysis of the essay, lyric, drama, and other Elizabethan forms (through the study of such authors as Bacon, Spenser, Donne, Jonson, Marlowe, and, especially, Shakespeare) and experimentation with the methods of their successful oral interpretation.

COM 545. THEORIES OF ORAL INTERPRETATION. Class 3, cr. 3. Prerequisite: a course in oral interpretation, or consent of instructor.

A study of the theories of oral interpretation of literature that have emerged from the classical period of Greece and Rome to the present. Emphasis on the influence of leaders in the field during the eighteenth, nineteenth, and twentieth centuries.

CREATIVE ARTS

Art and Design

UNDERGRADUATE LEVEL

A&D 105. DESIGN I. Class 1, Studio 5, cr. 3.
Two-demensional design; an introduction to the elements of design with experiments in the creation of forms and shapes and their organization in a two-dimensional field.

A&D 106. DESIGN II. Class 1, Studio 5, cr. 3.
Three-dimensional design; an introduction to the organization of forms and volumes in space with experiments in the use of various materials and simple tools.

A&D 113. BASIC DRAWING. Class 1, Studio 5, cr. 3.
An introduction to drawing and sketching as a means of communication of ideas.

A&D 114. DRAWING II. Class 1, Studio 5, cr. 3. Prerequisite: A&D 113 or consent of instructor.
Continuation of A&D 113; emphasis is given to the exploration of a variety of media and the structuring of pictorial space.

A&D 200. DRAWING AND PAINTING I. Class 1, Studio 5, cr. 3. Prerequisites: A&D 105 and 214 or consent of instructor.
Course designed to stimulate a beginning understanding of the philosophies, the use of materials, and the practices leading to the art of painting.

A&D 201. ART FOR ELEMENTARY SCHOOL TEACHERS. Class 2, Studio 4, cr. 4.
Art theory and experiences and curriculum theory and materials preparatory to instruction of elementary school children.

A&D 202. HISTORY AND THEORY OF ART EDUCATION. Sem. 1 and 2. Class 3, cr. 3.
Lectures, readings, and discussions covering the history, theory, and professional literature of art education. (Required prior to professional semester.)

A&D 207. PHOTOGRAPHY I. Sem. 1 and 2. Class 1, Studio 5, cr. 3. Prerequisites: A&D 106 and 114, or consent of instructor.
Introduction to the basic visual and technical qualities of photography.

A&D 213. LIFE DRAWING I. Class 1, Studio 5, cr. 3. Prerequisites: A&D 113 and 114 or consent of instructor.
Introduction to drawing the human figure with emphasis upon structure and gesture.

A&D 214. LIFE DRAWING II. Class 1, Studio 5, cr. 3. Prerequisites: A&D 113 and 114 or consent of instructor.
Continuation of A&D 213; emphasis is given to organizing the figure in pictorial space.

A&D 242. CERAMICS I. Sem. 1 and 2. Class 1, Studio 5, cr. 3. (Formerly A&D 369.) Prerequisites: A&D 106 and 114, or consent of instructor.
Beginning problems in ceramics.

A&D 259. PAINTING II. Sem. 1 and 2. Class 1, Studio 5, cr. 3. Prerequisite: A&D 200 or consent of instructor.
A continuation of A&D 200.

A&D 264. CRAFTS. Class 1, Studio 5, cr. 3. Prerequisites: A&D 106 and 114, or consent of instructor.
Exploration in the creative use of clay and metal media—pottery, jewelry, metal enameling.

A&D 265. PRINT MAKING I. Sem. 1 and 2. Class 1, Studio 5, cr. 3. Prerequisites: A&D 105 and 113, or consent of instructor.
An introduction to the techniques and creative use of woodcut, linecut, wood engraving, and serigraphy.

A&D 301. ART IN SECONDARY SCHOOL. Sem. 1 and 2. Class 2, Studio 2, cr. 3. Prerequisite: sophomore standing or consent of instructor. (Required prior to professional semester.)
Art theory and experiences and curriculum theory preparatory to the instruction of secondary school students.

A&D 355. ART APPRECIATION. Class 3, cr. 3. Not open to freshmen.

Understanding and appreciation of the problems overcome by mankind in the origins and growth of art.

A&D 365. PAINTING III. Class 1, Studio 5, cr. 3. Prerequisite: A&D 259 or consent of instructor.

A studio course concentrating on the introduction of attitudes designed to help the individual student to a greater consciousness of his personal creative needs and to help him develop personal means of expression within the art of painting.

A&D 590. SPECIAL ART PROBLEMS. Sem. 1 and 2. Cr. 1-6. Prerequisite: ten hours of art and design. Permission by the head of the department is required.

Individual problems in art history, appreciation, design, crafts, drawing, and painting. Credit dependent upon amount of work done.

GRADUATE LEVEL

A&D 601. SEMINAR IN ART EDUCATION. Class 3, cr. 3.

Music History and Theory

UNDERGRADUATE LEVEL

MUS 250. MUSIC APPRECIATION. Class 3, cr. 3.

An introduction to the understanding of music. How to listen to its materials. A study of the media, forms, styles, and composers through recorded, live, and film media. Methods used in the structure of music as well as the aesthetic values present in music are also emphasized.

MUS 490. GUIDED READING IN MUSIC. Cr. 1-6.

The course is offered for students with specialized needs and interests in the field.

Theatre

UNDERGRADUATE LEVEL

THTR 110. SPEECH FOR THE STAGE I. Class 1, Lab. 3, cr. 2. Prerequisite: consent of instructor.

Concentration on structural and tonal action in voice production for the stage. Emphasis on the relationship of the speaking voice to the singing voice. Development of the full resonant voice and elimination of undesirable vocal qualities. Use of dramatic literature for laboratory work.

THTR 130. ACTING I. Class 1, Lab. 3, cr. 2. (Should not be taken concurrently with THTR 340.)

Training and exercise in the basic elements of acting and the use of the stage. Study of historical and theoretical backgrounds of acting and of different types of plays and staging.

THTR 136. REHEARSAL AND PERFORMANCE I. Cr. 1 or 2. (May be repeated once for credit. Maximum number of credits for any combination of THTR 136, 168, 336, and 368 is 4.) Prerequisite: consent of instructor.

Study of practice of rehearsal techniques and of stage performance. Students will be assigned to acting and stage management duties in the experimental and major stage productions.

THTR 168. TECHNICAL THEATRE PRODUCTION I. Lab. 3 or 6, cr. 1 or 2. (May be repeated once for credit. Maximum number of credits for any combination of THTR 136, 168, 336, and 368 is 4.) Prerequisite: consent of instructor.

The study and application of technical theatre practice in scene construction, painting, lighting, costuming, and stage management. Students will be assigned to experimental and major stage productions.

THTR 201. THEATRE APPRECIATION. Class 2, Lab. 2, cr. 3.

Understanding and appreciation of the theatre's role in the modern world, including a survey of dramatic structure and analysis, and the functions of the actor, director, designer, and critic related to current stage productions.

Laboratory work includes attendance and discussion of the dramatic presentations on campus.

THTR 230. ACTING II. Class 1, Lab. 3, cr. 2. Prerequisite: THTR 110, 120, 130, and/or consent of instruc-

tor. (Should not be taken concurrently with THTR 255 or 340.)

Continued training and exercise in the basic elements of acting, including prose dialogue and sight reading; beginning work in role and script analysis; rehearsal in simple scenes. Advanced exercises in believability, observation and awareness, concentration, imagination, and the sense-memory-recall leading to characterization.

THTR 255. STAGECRAFT FOR SECONDARY SCHOOLS. Class 1, Lab. 6, cr. 3. (Open only to teaching option students, who will be required to accept one University Theatre production responsibility; two of the six laboratory hours will be reserved for this work. Should not be taken concurrently with THTR 230. Credit will not be given for both THTR 255 and 155.)

Study of the organizational structure of technical aspects of theatre. Training in planning, executing, painting, and lighting scenery for the stage. Study of the forms of scenery and common physical attributes of the stage.

The study of the above area is supplemented by extensive practical work in each field.

THTR 336. REHEARSAL AND PERFORMANCE II. Cr. 1 or 2. (May be repeated once for credit. Maximum number of credits for any combination of THTR 136, 168, 336, and 368 is 4.) Prerequisite: consent of instructor.

The study and practice of rehearsal techniques and stage performance. Students will be assigned to acting and stage management duties in experimental and major stage productions.

THTR 340. INTRODUCTION TO PLAY PRODUCTION AND DIRECTION. Class 2, Lab. 2, cr. 3. Prerequisite: THTR 255. (Should not be taken concurrently with THTR 130 or THTR 230.)

A basic study of directing and administration of play production in the high school: audience analysis, play selection, play lists, play analysis, casting, directing procedures, rehearsal and performance techniques, promotion and publicity, interdepartmental cooperation, and the school dramatic organization. Laboratory application of directing practice.

THTR 360. STAGE DESIGN. Class 1, Lab. 4, cr. 3. Prerequisite: THTR 225 or 340 or consent of instructor.

A basic study of the theories and practices in the application of three-dimensional design to the stage.

THTR 368. TECHNICAL THEATRE PRODUCTION II. Cr. 1 or 2. (May be repeated once for credit. Maximum number of credits for any combination of THTR 136, 168, 336, and 368 is 4.) Prerequisite: consent of instructor.

The study and application of technical theatre practice in scene construction, painting, lighting, costuming, and stage management. Students will be assigned to experimental and major stage productions.

DUAL LEVEL
Undergraduate-Graduate

THTR 530. ADVANCED ACTING. Class 2, Lab. 2, cr. 3. Prerequisite: THTR 130, 230, and/or consent of instructor.

Advanced work in role and script analysis and character development, including study and practice in difficult prose and verse dialogue reading; intensive study of internal and external aspects of characterization, interaction, and ensemble playing; rehearsal in complex scenes; and participation in one play.

THTR 534. CHILDREN'S CREATIVE DRAMATICS. Class 2, Lab. 2, cr. 3.

Principles of creativity as used in improvision and dramatization. Methods of relating these to children's experiences and children's literature. Direct application of the learning through supervised activity with elementary or junior high students.

THTR 541. DRAMATIC PRODUCTION IN SCHOOL AND COMMUNITY. Class 1, Lab. or 4, cr. 2 or 3.

The theory and practice of planning and producing plays. Selection, analysis, casting, blocking, rehearsal, schedules, characterization, polishing and performance procedures. Laboratory projects in movement, picturization, and directed scenes.

THTR 580. HISTORY OF THE THEATRE I. Class 3, cr. 3.

The study of the theatre in the western world from its primitive origins, through the Greek, Roman, Medieval, and Renaissance periods.

THTR 581. HISTORY OF THE THEATRE II. Class 3, cr. 3.

A study of the major periods in the development of the theatre from 1640 to 1900: French Neo-classicism. English Restoration, melodrama, sentimental and bourgeois theatre of the eighteenth century, German and French Romanticism, and the nineteenth-century theatre of Germany, France, Scandinavia, and England.

THTR 590. DIRECTED STUDY OF SPECIAL THEATRE PROBLEMS. Cr. 1-3. Admission by consent of instructor. (May be repeated for credit.)

An individualized and intensive study of any aspect of theatre required by the student's plan of study.

MUSIC—See Department of Speech and Creative Arts

PHILOSOPHY—See Department of History and Political Science

PHYSICAL EDUCATION—See Department of Education

POLITICAL SCIENCE—See Department of History and Political Science

PSYCHOLOGY—See Department of Behavioral Sciences

RECREATION—See Department of Education

SOCIOLOGY—See Department of Behavioral Sciences

SPANISH—See Department of Modern Languages

THEATER—See Department of Speech and Creative Arts

Transfer Programs

AGRICULTURE

The School of Agriculture at the Lafayette Campus offers the programs described in this section. They are administered locally by the Department of Biology in the School of Basic and Applied Sciences.

The School of Agriculture trains students for many types of agricultural work including not only farming but also related educational and industrial activities. Nine departments in the School of Agriculture offer optional programs preparing students for jobs in research, teaching, and extension, as well as in various related commercial enterprises. Instructional work is based on fundamental training in biology, chemistry, and physics, together with courses in history, economics, English, psychology, and other similar fields.

Students in northwest Indiana are being offered the opportunity to complete the first two years of requirements for Purdue's Bachelor of Science degree in Agriculture at the Calumet Campus. After the two-year course of study at Calumet, students may complete requirements for graduation at the West Lafayette Campus.

Students may qualify for admission to the School of Veterinary Medicine at Purdue, West Lafayette, by completing two years of courses in the School of Agriculture at the Calumet Campus and then transfering to West Lafayette. These students are advised to have alternative degree objectives in mind, since only a limited number of candidates can expect to be admitted to the School of Veterinary Medicine.

The following two year programs are offered through the Department of Biology at the Calumet Campus. They satisfactorily prepare students who will be transfering to West Lafayette for thirty or more options which may be completed in the School of Agriculture. An advisor should be consulted to determine which courses and which program are best suited to the student's interests.

Admission requirements for Agriculture, Forestry, and Preveterinary Science

Admission to programs in the School of Agriculture requires rank in the upper two-thirds of the high school class, upper one-third for out-of-state students. Subject matter requirements include: three semesters of high school algebra, two semesters of geometry, one semester of trigonometry (required for forestry majors only), two semesters of a lab science, and six semesters of English. SAT or ACT tests are required.

PLAN OF STUDY IN GENERAL AGRICULTURE

FRESHMAN YEAR

First Semester		Second Semester	
(3)	MA 153 (Algebra and Trigonometry I)	(3)	MA 154 (Algebra and Trigonometry II)
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(4)	BIOL 109 (Introduction to Zoology)	(4)	BIOL 108 (Introduction to Botany)
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(1)	AGR 101 (Agricultural Lecture)	(3)	Agricultural elective
(3)	Agricultural elective		
(17)		(16)	

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	COM 114 (Fundamentals of Speech Communication)	(3-4)	*BIOL 221 (Introduction to Microbiology) or STAT 301 (Elementary Statistical Methods I)
(4)	CHM 251 (Organic Chemistry)	(3)	ECON 210 (Principles of Economics)
(1)	CHM 251L (Organic Chemistry Lab)	(3)	AGRY 430 (Genetics)
(3)	CS 210 (Introduction to Data Processing)	(1)	AGRY 430L (Genetics Laboratory)
(3)	Agricultural elective	(3)	ANSC 221 (Introductory Animal Nutrition)
(3)	H.E.S.S. elective	(3)	elective
(17)		(16-17)	

PLAN OF STUDY IN FORESTRY

FRESHMAN YEAR

(Same as General Agriculture)

SOPHOMORE YEAR

Third Semester		Fourth Semester	
(3)	MA 223 (Introductory Analysis)	(3)	STAT 301 (Elementary Statistical Methods I)
(3)	BIOL 285 (Environmental Biology)	(3)	ECON 210 (Principles of Economics)
(3)	COM 114 (Fundamentals of Speech Communication)	(6)	Agricultural elective
(3)	CS 210 (Introduction to Data Processing)[2] or H.E.S.S. elective	(3)	elective
(3)	INDM 200 (Introductory Accounting)		
(15)		(15)	

* Course depends on option chosen.

NOTES: 1. other students in Forestry may require CHM 255-256.
2. Course depends upon option chosen.

PLAN OF STUDY IN PREVETERINARY SCIENCE AND MEDICINE

FRESHMAN YEAR

First Semester

(3) MA 153 (Algebra and Trigonometry I)
(3-4) *CHM 111 (General Chemistry) or
CHM 115 (General Chemistry)
(4) BIOL 109 (Introduction to Zoology)
(3) ENGL 104 (English Composition I)
(1) AGR 101 (Agriculture Lecture)
(3) Agricultural elective

(17-18)

Second Semester

(3) MA 154 (Algebra and Trigonometry II)
(3-4) *CHM 112 (General Chemistry) or
CHM 116 (General Chemistry)
(4) BIOL 108 (Introduction to Botany)
(3) ENGL 105 (English Composition II)
(3) H.E.S.S. elective

(16-17)

SOPHOMORE YEAR

Third Semester

(4) PHYS 220 (General Physics)
(3) CHM 255 (Organic Chemistry)
(1) CHM 255L (Organic Chemistry Laboratory)
(3) COM 114 (Fundamentals of Speech Communication)
(3) ECON 210 (Principles of Economics)
(3) elective

(17)

Fourth Semester

(4) PHYS 221 (General Physics)
(3) CHM 256 (Organic Chemistry)
(1) CHM 256L (Organic Chemistry Laboratory
(3-4) Elective or CHM 223 (Introductory Qualitative Analysis)
(3) AGRY 430 (Genetics)
(1) AGRY 430L (Genetics Laboratory)
(3) ANSC 221 (Introductory Animal Nutrition)

(18-19)

ELECTIVES
(may be used in all programs)

(3) AGEC 100 (Introductory Agricultural Business and Economics)
(3) AGRY 105 (Crop Production)
(3) ANSC 161 (Introduction to Food Science)
(3) ANSC 221 (Introductory Animal Nutrition) may be taken only after completing CHM 112 or equivalent
(3) FOR 103 (Introduction to Natural Resource Conservation)
(1) FOR 103L (Natural Resource Conservation Laboratory)
(3) HORT 102 (Fundamentals of Horticulture)

* The preferred Chemistry sequence is CHM 111-112, 223; with exceptionally strong high school chemistry background, students may take the CHM 115-116 sequence.

AGRICULTURE

UNDERGRADUATE LEVEL

AGR 101. AGRICULTURAL LECTURES. Class 2, cr. 1.

To acquaint new students in agriculture with the important problems and opportunities in the various fields of agriculture.

AGRICULTURAL ECONOMICS

UNDERGRADUATE LEVEL

AGEC 100. INTRODUCTORY AGRICULTURAL BUSINESS AND ECONOMICS. Class 3, cr. 3.

The role and characteristics of farm and off-farm agricultural businesses in our economy; introductory economic and business principles involved in successful organization, operation, and management. Consideration given to major marketing issues, such as decentralization, integration, costs and margins, government regulations, marketing orders, promotion, grades and standards, and cooperatives.

AGRONOMY

UNDERGRADUATE LEVEL

AGRY 105. CROP PRODUCTION. Class 2, Lab. 2, cr. 3.

Fundamental principles of crop production and distribution. An introduction to basic soil relations, current field crop production practices, agricultural meteorology, turfgrass management, and plant breeding.

AGRY 430. GENETICS. Class 3, cr. 3. Prerequisite: BIOL 108 or 109, or equivalent.

The transmission of heritable traits, probability; genotypic-environmental interactions; chromosomal abberations; polyploidy; gene mutations; genes in populations; the structure and function of nucleic acids; biochemical genetics; molecular genetics; coding.

AGRY 430L. GENETICS LABORATORY. Lab. 2, cr. 1. Prerequisite or corequisite: AGRY 430.

Experiments and demonstrations with higher plants, fruit flies, flour beetles, mice, bacteria, viruses, and fungi to elucidate the basic principles of genetics.

ANIMAL SCIENCES

UNDERGRADUATE LEVEL

ANSC 101. ANIMAL AGRICULTURE. Class 3, cr. 3.

Importance of livestock in the field of agriculture, and the place of meats and other animal products in the human diet.

ANSC 161. INTRODUCTION TO FOOD SCIENCE. Class 3, cr. 3.

The world food supply in relation to biological and cultural requirements of man; principles and trends in food procurement and preservation; new product development; nutritional changes involved in processing and distribution of man's food.

ANSC 221. INTRODUCTORY ANIMAL NUTRITION. Class 3, cr. 3. Prerequisite: CHM 111 or 112, or equivalent.

A study of the digestive processes, composition of feedstuffs, nutritional requirements, and formulation of practical rations for farm animals.

FORESTRY AND CONSERVATION

UNDERGRADUATE LEVEL

FOR 103. INTRODUCTION TO NATURAL RESOURCE CONSERVATION. Class 3, cr. 3.

Development and use of natural resources, with special emphasis on renewable natural resources. Lectures. Directed program of supplemental reading for additional credit.

FOR 482. CONSERVATION OF NATURAL RESOURCES. Class 2, Lab. 3, cr. 3.

Classroom and laboratory instruction in natural resource conservation. Designed for teachers of vocational agriculture, biological sciences, general sciences, home economics, and social studies.

HORTICULTURE

UNDERGRADUATE LEVEL
Lower-Division Courses

HORT 102. FUNDAMENTALS OF HORTICULTURE. Class 3, cr. 3.

Study of the biology and technology involved in the production storage, processing, and marketing of horticultural plants and products.

HOME ECONOMICS

Dean Compton in charge, West Lafayette

Programming in Home Economics at the Calumet Campus administered by the Department of Behavioral Sciences is mainly designed to offer the first year or two of some curricula for area students who must then transfer to the Lafayette Campus for the completion of the baccalaureate degree. A few graduate courses are offered for professional home economists practicing in the area. Where possible students are encouraged to consult directly with the Faculty of the School of Home Economics in Lafayette regarding long range career interests.

The plan of study in home economics is designed to prepare young men and women for professional work in the various areas of the field and at the same time to provide a broad general education which prepares the student to meet the needs for home and community living.

Representative of the areas of concentration are clothing and textiles, foods and nutrition, foods in business, food research, home economics extension, housing, vocational home economics teaching, institutional management, and interior design.

Students interested in preparation for work in the fields mentioned above should enroll in the curriculum listed below.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	ENGL 104 (English Composition I)	(3)	ENGL 105 (English Composition II)
(3)	SOC 100 (Introductory Sociology)	(3)	PSY 120 (Elementary Psychology)
(2)	C&T 102 (Clothing I) and	(3)	HEED 226 (Furnishing and the Home)
(1)	C&T 112 (Clothing Lab) or	(3)	F&N 205 (Foods I)
(3)	A&D 105 (Design I)	(3)	CHM 112 (General Chemistry)*
(3)	Mathematics	(3)	Elective
(3)	CHM 111 (General Chemistry)*		
(18)		(18)	

SOPHOMORE YEAR

Refer to current *School of Home Economics* bulletin. See curriculum for option selected. The areas of concentration with specific options in each area are as follows:

* Not required for nursery school-kindergarten teaching.

Clothing and Textiles
Retailing in the Fashion Field
Textile Technology

Housing, Equipment and Environmental Design
Housing

Foods and Nutrition
Dietetics (General and Clinical)
Foods in Business
Foods, Nutrition, and Related Science
Food Science

Home Management and Family Economics
Social Welfare

Restaurant, Hotel, and Institutional Management
Institutional Management (Science Emphasis)
Restaurant and Lodging Management (Business Emphasis)
Food Service and Lodging Supervision (Associate Degree in Applied Science offered at West Lafayette and Indianapolis)

Home Economics Education
General Home Economics Teaching
Vocational Home Economics Teaching

Child Development and Family Life
Nursery-Kindergarten Teaching

Home Economics
Interior Design
Option X

HOME ECONOMICS

HE 101. ANALYSES OF HOME ECONOMICS PROFESSIONS. Class 1, cr. 1.

General orientation and the study of the professional opportunities in the various areas of home economics.

CHILD DEVELOPMENT AND FAMILY LIFE

Donald Felker, Head (W. Lafayette)

UNDERGRADUATE LEVEL

CDFL 201. THE FAMILY: AN ECOSYSTEM I (A MICROANALYSIS). Class 2, cr. 2.

A study of the family as a system of members interacting within the framework of the home environment to satisfy basic needs and attain goals.

CDFL 209. FAMILY HEALTH. Class 2, Lab. 1, cr. 2. (Laboratory for five weeks only.)

Lectures and demonstrations on the fundamental principles of nursing in the home, disease prevention, and maternal and infant care.

CDFL 211. DEVELOPMENT AND GROWTH OF YOUNG CHILDREN. Class 3. Lab. 2, Cr. 4. Prerequisite: Three hours in either Psychology and Sociology.

For CDFL majors, the study of the growth and development of young children from birth through six years of age. Special emphasis on physical growth, emotional and social behavior, cognitive and language development. Focus on observational methods, laboratory recitation and participation.

CDFL 250. AFFECT IN HUMAN DEVELOPMENT. Class 3, cr. 3. Prerequisite: admission to human development

curriculum or consent of instructor.

An analysis of the place of affect in human function and development, its relationship to cognition, and its influence on personal and professional attitudes and interactions.

CDFL 311. ADVANCED CHILD DEVELOPMENT. Class 3, cr. 3. Prerequisite: CDFL 211 or consent of instructor.

Current issues in child development are explored within the context of recent research. Contrasting theoretical and methodological approaches are critically evaluated.

CDFL 350. MARRIAGE AND FAMILY RELATIONSHIPS. Class 3, cr. 3.

Designed to provide further understanding of family relationships for those unmarried, those contemplating marriage, those married, and prospective counselors of all of them. A functional approach to the interpersonal relationships of courtship, marriage, and family life. Open to both men and women.

CDFL 414. BOOKS AND PICTURES FOR YOUNG CHILDREN. Class 2, cr. 2. Prerequisite: CDFL 210.

Survey and evaluation of pictures, books, and stories for children through five years of age; principles of guiding children in their enjoyment.

CDFL 416. MUSIC FOR YOUNG CHILDREN. Class 2, cr. 2. Prerequisite: CDFL 210.

Methods and materials for guiding young children in musical experiences.

CDFL 436. ADMINISTRATION OF PROGRAMS FOR YOUNG CHILDREN. Class 2, Lab. 2, cr. 3. Prerequisites: CDFL 210, 414, 416, 521, and senior standing.

Implementing goals in diverse programs for young children through use of budgets, equipment and supplies, director-staff relationships, parent-school relationships, and organization of time and effort; meeting licensing requirements.

CDFL 450. SUPERVISED TEACHING IN NURSERY SCHOOL AND KINDERGARTEN. Cr. 2-8. Prerequisite: CDFL 210; prerequisite or corequisite: CDFL 414, 416, or 521.

Observation and teaching of nursery school and kindergarten under the supervision of the Department of Child Development and Family Life staff and the teachers in charge of classes. Supervised student teaching in nursery school is in various types of programs. Supervised student teaching in kindergarten is in public schools.

DUAL LEVEL
Undergraduate-Graduate

CDFL 520. INFANT BEHAVIOR. Class 3, cr. 3. Prerequisite or corequisite: CDFL 210.

Recent studies of infant behavior from birth to two years.

CDFL 521. PLAY OF YOUNG CHILDREN. Class 2, Lab. 2, cr. 3. Prerequisite: CDFL 210 or equivalent.

The development of the child from birth to eight years, through play activities. Theories and planning of activities for facilitating growth are presented in lecture and illustrated in laboratory participation.

CDFL 551. PARENT EDUCATION. Class 3, cr. 3. Prerequisites: a total of 15 hours in education, psychology, and child development.

Principles of child study as communicated by films, creative activities, speakers, observation, and discussion in considering children's needs, parent guidance, and teacher attitudes. Designed for students, teachers, and interested parents.

CLOTHING AND TEXTILES

Fern Rennebohm, Head (W. Lafayette)

UNDERGRADUATE LEVEL

C&T 102. SURVEY OF THE CLOTHING FIELD. Class 3, cr. 3.

Aesthetic, cultural and technological factors in the selection of clothing and textiles. Retailing and other career opportunities in the field.

C&T 112. CLOTHING I LABORATORY. Lab. 3, cr. 1.

Experimental study of fabric characteristics and construction principles in creating a unified garment.

C&T 209. INTRODUCTION TO FASHION RETAILING. Class 3, cr. 3.

Careers in fashion merchandising; types of stores and their organization, operation, and service structure.

DUAL LEVEL
Undergraduate-Graduate

C&T 533. READINGS IN TEXTILES AND CLOTHING. Class 2, cr. 2 or 3. Admission by consent of head of department.

C&T 536. PATTERN DESIGN. Class 1, Lab. 4, cr. 3. Prerequisites: C&T 102 and 112 or consent of the head of the department.

Interpretation of design and basic principles of pattern construction through drafting.

C&T 538. CLOTHING DESIGN. Class 1, Lab. 4, cr. 3. Prerequisites: C&T 102 and 112 or consent of the head of the department.

C&T 590. PROBLEMS IN CLOTHING AND TEXTILES. Credit variable. Must be preceded by courses approved by head of department.

Individual problems.

HOUSING EQUIPMENT AND ENVIRONMENTAL DESIGN

Kathleen Johnston, Head (W. Lafayette)

UNDERGRADUATE LEVEL

HEED 226. FURNISHINGS AND THE HOME. Class 2, Lab. 2, cr. 3.

Selection of housing and home furnishings for family living.

HEED 245. INTRODUCTION TO HOUSEHOLD EQUIPMENT. Class 3. Cr. 3.

A consumer approach to the study of household equipment.

FOODS AND NUTRITION

Paul Abernathy, Head (W. Lafayette)

UNDERGRADUATE LEVEL

F&N 203. FOODS: THEIR SELECTION AND PREPARATION. Class 2. Lab. 3. Cr. 3.

Principles of food selection. Preparation, and meal planning. Includes purchasing guides, nutrition principles, and meal service.

F&N 205. FOODS I. Class 1, Lab. 4, cr. 3. Prerequisite: CHM 111; prerequisite or corequisite: CHM 112.

Scientific principles and techniques in food preparation.

F&N 303. ESSENTIALS OF NUTRITION. Class 3, cr. 3. No prerequisites. Credit not given for both F&N 303 and 315.

Basic nutrition and its application in meeting nutritional needs of all ages. Consideration is given to food selection and legislation and community nutrition education programs.

F&N 315. FUNDAMENTALS OF NUTRITION. Class 3, cr. 3. Prerequisites: organic chemistry and physiology. Credit not given for both F&N 303 and 315.

Basic principles of nutrition and their application in meeting nutritional needs during the life cycle.

DUAL LEVEL
Undergraduate-Graduate

F&N 525. MATERNAL, INFANT, AND CHILD NUTRITION. Class 3, cr. 3. Should be preceded by F&N 435 or equivalent.

Nutrition and physiological interrelationships during the reproductive cycle, infancy, and childhood.

F&N 538. READINGS IN NUTRITION. Cr. 2-3. Prerequisite: F&N 435 or graduate standing.

Survey of recent literature in the field of nutrition.

F&N 590. SPECIAL PROBLEMS IN NUTRITION. Cr. 2-4. Credit and hours to be arranged. Prerequisites: courses approved by the head of the department.

Individual problems dealing with various aspects of nutrition.

HOME MANAGEMENT AND FAMILY ECONOMICS

Sarah Manning, Head (W. Lafayette)

DUAL LEVEL
Undergraduate-Graduate

HMFE 585. FAMILY AND CONSUMER LAW. Class 3, cr. 3.

A study of the legal rights, responsibilities, and recourse of family members as they function within the economy and society.

HMFE 587. USE OF FAMILY RESOURCES. Class 3, cr. 3. Prerequisites: introductory economics and consent of instructor.

Family resource use and its interaction with the economy.

Faculty and Staff

A. JOSEPH ADAMS (1968) ..... Acting Head, Department of Information Systems and Computer Programming; Associate Professor of Computer Technology
B.S., Notre Dame, 1952; M.S., Illinois Institute, 1964 (P.E., Indiana).

WALTER F. C. ADE (1959)..... Associate Professor of Modern Languages and Education
B.A., Queen's (Canada), 1933; M.A., Toronto (Canada), 1939; B.Paed., M.Ed., 1943; M.S. Ed., Indiana, 1955; Ph.D., Northwestern 1949; Ed.D., Indiana, 1960.

CLAYTON W. ANDERSON (1970) ..... Professor of Industrial Management
B.S., DePaul, 1947; M.S., Indiana, 1950; M.B.A., Chicago, 1954; Ph.D., Northwestern, 1969.

ROBERT L. ANDERSON, (1947) ..... Professor of Electrical Engineering Technology
B.S., Rose Polytechnic 1942 (P.E. Indiana).

EDWARD ANDREWS (1967)..... Comptroller
B.S., Indiana State, 1965.

GARY A. AUSTIN (1971) ..... Supervisor of Systems and Programming
B.S., Purdue, 1971.

KAREN P. BACUS (1972)..... Assistant Professor of Speech
B.A., B.S., Kansas State Teachers, 1961; M.S., 1962; Ph.D., Kansas, 1974.

NAVY F. BANVARD (1969)..... Purchasing Manager
A.B., Johns Hopkins, 1951.

WILLIAM J. BARLOW (1971)..... Assistant Professor of Mathematics and Statistics
B.S., Missouri, 1957; M.S., Illinois, 1965; Ph. D., 1971.

JOSEPH R. BATTENBURG (1968)..... Associate Professor of Mechanical Engineering
B.S., Andrews, 1954; B.S., Michigan, 1956; M.S., Southern California, 1960; Ph.D., Wisconsin, 1967.

ROBERT D. BECHTEL (1966)..... Professor of Mathematics Education
B.S., McPherson, 1953; M.S., Kansas State, 1959; Ph.D., Purdue, 1963.

LARRY L. BECK (1966) ..... Director of Buildings and Grounds; Assistant Professor of Architectural Technology
A.A.S., Purdue, 1963; B.S., 1966; M.B.A., Chicago, 1971.

RALPH E. BENNETT (1970) ..... Assistant Professor of Civil Engineering Technology
B.S., Wisconsin, 1962; M.S., Illinois Institute, 1972 (P.E. Indiana).

GEORGE E. BOCK (1957 — 1965)..... Professor Emeritus of Mechanical Engineering Technology
A.B., Columbia, 1922; M.E., 1924 (P.E., Indiana, Illinois, Washington).

MARCEL L. BOLDUC (1970) ..... Assistant Professor of Modern Languages
B.A., St. Francis, 1960; M.A., Middlebury, 1966; Ph.D., Northwestern, 1974.

RAYMOND BORGMAN (1971)..... Supervisor of General Services

JUNE M. BROCKEL (1970) ..... Director of Health Services
B.S., Ball State, 1960; R.N., Indiana.

LOREN E. BRUNNER (1964)..... Professor of Electrical Engineering Technology
B.S., U.S. Coast Guard Academy, 1935; S.B., S.M., MIT, 1942.

LOUISE G. BUECHLEY (1967) ..... Assistant Professor of Nursing
B.A., Lynchburg, 1944; M.N., Yale School of Nursing, 1947; R.N., Indiana.

EUNICE D. BURNS (1975)..... Professional Counselor, Special Services
B.S., Ball State, 1974.

PHYLLIS S. BUROSH (1974) ..... Assistant Professor of Nursing
B.S.N., Loyola, 1970; M.P.H., Johns Hopkins, 1973; R.N., Indiana.

EDGAR H. BUYCO (1968) ..... Associate Professor of Mechanical Engineering
B.S., St. Thomas (Manila), 1953; Ph.D., Purdue, 1961.

RICHARD E. CAPLAN (1975) ..... Assistant Professor of Communication
B.A., Michigan State, 1970; M.A., Wayne State, 1973; Ph.D., 1975.

JOHN C. CARLISLE (1972)..... Assistant Professor of English
B.S., Southern Illinois, 1960; M.S., 1962; M.A., Wayne State, 1969; Ph.D., Michigan, 1972.

ALAN H. CARLSON (1962)..... Assistant Professor of Chemistry
B.S., North Central, 1950; M.S., Nebraska, 1952.

JEFFREY D. CASE (1975) ..... Instructor in Electrical Engineering Technology
B.S., Purdue, 1973; M.S., 1974.

YJEAN S. CHAMBERS (1971) ..... Assistant Professor of Speech
B.Ed., Illinois State, 1943; M.A., Purdue, 1973.

YUNG C. CHEN (1974) ..... Assistant Professor of Engineering
B.S., Chen Kung, 1964; M.S., Illinois, 1967; Ph.D., Cornell, 1971.

THEODORE S. CHIHARA (1971) ..... Head, Department of Mathematical Sciences; Professor of Mathematics
B.S., Seattle, 1951; M.S., Purdue, 1953; Ph.D., 1955.

PETER P. CHOJENSKI (1969) ..... Reference Librarian; Assistant Professor of Library Science
B.S., Gannon, 1963; M.L.S., Pittsburgh, 1968.

CHESTER D. CLAPP (1969) ..... Head, Department of Behavioral Sciences; Professor of Psychology
B.S., Wayne State, 1942; M.S.W., Michigan, 1947; A.M., 1948; Ph.D., 1951.

DONALD L. CLARK (1969)..... Assistant Professor of Mathematics
B.S., Purdue, 1957; M.S., Illinois Institute, 1964.

EDWIN COHEN (1974) ..... Head, Department of Communications and Creative Arts; Associate Professor of Speech
A.B., California State, 1956; M.A., 1964; Ph.D., Southern California, 1971.

CHARLES E. COLUMBUS (1965) ..... Head, Department of Manufacturing Technology; Professor of Mechanical Engineering Technology
B.S., U.S. Coast Guard Academy, 1935; S.M., MIT, 1943.

RICHARD J. COMBS (1955) ..... Chancellor with the Rank of Professor
A.B., A.M., South Dakota, 1951.

ARDATH A. COOLIDGE (1966) ..... Associate Professor of Home Economics
A.B., Earlham, 1941; Ph.D., Iowa State, 1945.

KAREN M. COREY (1963) ..... Reader Service Librarian and Assistant Professor of Library Science
A.B., Purdue, 1963; M.S., Indiana, 1973.

LARRY M. CRAWFORD (1962-1965, 1968) ..... Director of Counseling; Assistant Professor of Education
B.P.E., Purdue, 1960; M.S., 1961; Ed.D., Indiana, 1972.

MILAN DAKICH (1970) ..... Assistant Professor of Speech
B.S., Indiana State, 1953; M.S., 1964.

VYTENIS B. DAMUSIS (1970) ..... Assistant Professor of Psychology
B.S., Wayne State, 1964; M.A., 1970; Ph.D., 1972.

JOHN E. DAVIS (1969) ..... Associate Professor of Education
B.S., Oregon College of Education, 1956; M.Ed., Oregon, 1961; Ed.D., 1964.

E. GENE DE FELICE (1970) ..... Assistant Professor of Political Science
B.A., Hofstra, 1964; M.A., Chicago, 1967; Ph.D., 1971.

GLENN E. DEGRAFF (1967) ..... Assistant Professor of Mechanical Engineering Technology
B.S., Purdue, 1965: M.S., 1967.

MELVIN D. DEGRAFF (1965) ..... Vice Chancellor for Student Services with the Rank of Professor
B.S., Illinois State, 1950; M.A., DePaul, 1955.

DONNA J. DELPH (1970) ..... Assistant Professor of Education
B.S., Ball State, 1953; M.A., 1963; Ed.D., 1970.

MARTIN J. DENKHOFF (1968) ..... Accounting Manager
B.S., Loyola, 1960.

JAMES E. DEUEL (1972) ..... Assistant Professor of Industrial Engineering Technology
B.S., Florida, 1955; M.S., 1956 (P.E., Florida).

MAURICE E. DIXON (1964) ..... Associate Professor of Speech
B.S., Ball State, 1959; M.A., Purdue, 1964.

TERENCE J. DOUGHERTY (1970) ..... Assistant Professor of Biology
A.B., Villanova, 1954; M.S., Pennsylvania, 1965; Ph.D., Delaware, 1970.

ERVIN A. DUDEK (1968) ..... Instructor in Architectural Technology
A.A.S., Purdue, 1967; B.S., 1968.

IZYDOR EISENSTEIN (1969) ..... Head, Department of Engineering; Professor of Mechanical Engineering
B.S., Israel Institute, 1940; Dipl.Ing., 1942; Ph.D., Purdue, 1969.

JOYCE A. ELLIS (1966) ..... Head, Department of Nursing; Professor of Nursing
St. Margaret, 1957; B.S., DePaul, 1964; M.S., 1965; R.N., Indiana.

PHILIP H. EMPEY, JR. (1970) ..... Assistant Professor of Economics
B.A., Brigham Young, 1966; Ph.D., Purdue, 1972.

E. EUGENE ENGLE (1966) ..... Head, Department of Administrative Sciences; Associate Professor of Accounting
A.B., Drury, 1946; M.B.A., New York, 1950. (C.P.A., Indiana).

M. GWENDOLYN ENGLE (1965) ..... Associate Professor of Nursing
Holy Cross, 1954; B.S., St. Mary's, 1956; M.S., Marquette, 1961; R.N., Indiana.

HARLAN D. FAYLE (1956 — 1973) ..... Professor Emeritus of Chemistry
B.A., Hamline, 1931; M.S., Minnesota, 1932; Ph.D., 1963.

GILBERT R. FISCHER (1964) ..... Associate Professor of Philosophy
A.B., Oberlin, 1938; Mus.B., 1940; Mus.M., North Texas State, 1949; A.M., 1950; Ph.D., Chicago, 1962.

P. VINCENT FLANNERY (1947) ..... Associate Professor of Physics
B.S., St. Mary's (Canada), 1939; M.S., Fordham, 1942.

JACK E. FORBES (1964) ..... Professor of Mathematics
B.S., Illinois Wesleyan, 1949; M.S., Bradley, 1952; Ph.D., Purdue, 1957.

JAMES J. FOSTER (1973) ..... Assistant Director, Project Upward Bound
B.S., Purdue, 1973.

JOHN P. FRUTH (1967) ..... Director of Admissions with the Rank of Assistant Professor
B.S., Manchester, 1950; M.A., Ball State, 1961.

RICHARD R. FRYER (1960) ..... Assistant Professor of Chemistry
B.S., Western Michigan, 1939; M.S., Loyola, 1967.

JONATHAN M. FURDEK (1973) ..... Assistant Professor of Economics
B.S., Marquette, 1968; M.A., 1970; Ph.D., Purdue, 1974.

EDWARD C. GALLETT (1954) ..... Associate Professor of Mechanical Engineering Technology
B.S., Illinois Institute, 1947; M.S., 1964.

BETTY G. GAWTHROP (1967) ..... Assistant Professor of English
B.A., Chicago, 1963; M.A., 1966; Ph.D., Purdue, 1973.

ROGER A. GEIMER (1966) ..... Associate Professor of English
B.A., St. Mary's, 1954; M.A., Marquette, 1956; Ph.D., Northwestern, 1962.

LOWELL C. GIBSON (1958) ..... Associate Professor of Chemistry
B.S., Illinois, 1943; M.S., Wisconsin, 1948; Ph.D., 1952.

WILLIAM V. GIDDINGS (1970) ..... Assistant Professor of Education
B.A., DePauw, 1963; M.A., Michigan State, 1964; Ed.D., Northern Illinois, 1971.

RHODA M. GIVENS (1972-1973,1975) ..... Instructor in Nursing
A.A.S., Purdue, 1967; B.S., 1972; R.N., Indiana.

JOYCE H. GODELS (1968) ..... Assistant Professor of Nursing
B.S., Loyola, 1964; R.N., Indiana.

RICHARD L. GONZALES (1969) ..... Dean of the School of Basic and Applied Sciences; Professor of Electrical Engineering
B.S.E.E., Bradley, 1952; M.S.E.E., 1963; Ph.D., Illinois, 1966.

DANIEL K. GOODMAN (1974) ..... Assistant Professor of Electrical Engineering
B.S.E.E., Missouri-Rolla, 1965; M.S.E.E., Stanford, 1967; Ph.D., New South Wales, 1971.

LEE R. GOODMAN (1967)..... Associate Professor of Speech
B.S., Indiana State, 1955; M.S., 1965.

KENNETH E. GRISWOLD (1967) ..... Associate Professor of Education
B.A., North Dakota State, 1950; M.Ed., William and Mary, 1958; Ed.D., Teachers College, Columbia, 1961.

MANFRED W. H. GROTE (1967) ..... Associate Professor of Political Science
B.A., Kansas, 1960; M.A., 1962; Ph.D., Maryland, 1967.

PARSHOTAM D. GUPTA (1968)..... Assistant Professor of Physics
M.S., Panjab, 1959; M.S., Carnegie Institute, 1963; Ph.D., Carnegie-Mellon, 1968.

SATISH K. GUPTA (1966) ..... Assistant Professor of Physics
B.S., Meerut (India), 1952; M.S., Delhi (India), 1954: M.S., Agra (India), 1956; M.S., Northwestern, 1962; Ph.D., Illinois Institute, 1966.

DONALD J. GUY (1972)..... Assistant Professor of Industrial Management
B.A., St. Bonaventure, 1960; M.S., Northern Illinois, 1967.

LEANNE HALFMAN (1975)..... Assistant Professor of Nursing
B.S., Indiana, 1967; R.N., Indiana.

WALTER HARTMANN (1957) ..... Associate Professor of Psychology
M.A., Chicago, 1949.

ROBERT C. HAYES (1956) ..... Associate Professor of Physical Education for Men
B.S., Ball State, 1949; M.A., 1956.

FRANK D. HAYS (1946)..... Associate Professor of Economics
Ph.B., Niagara, 1935; M.A., 1936.

STEPHEN M. HENDERSON (1975) ..... Graduate Instructor in Communications
B.F.A., North Carolina School of the Arts, 1972.

CRECENCIO J. HERNANDEZ (1972)..... Graduate Instructor in Modern Languages
B.A., Texas Technological, 1965.

H. ROLAND HEYDEGGER (1970) ..... Associate Professor of Chemistry
B.S., Queens, 1956; M.S., Arkansas, 1958; Ph.D., Chicago, 1968.

ROBERT J. HILL (1970)..... Associate Professor of Mathematics
B.S., Auburn, 1957; M.S., 1958; Ph.D., Alabama, 1970.

BERT A. HINDMARCH (1967, 1969) ..... Associate Professor of Supervision
B.S.B.A., Northwestern, 1947; M.B.A. Chicago, 1949.

BERNARD H. HOLICKY (1963, 1966)..... Director of Library Services; Associate Professor of Library Science
A.B., Ohio, 1959; M.S., Case Western Reserve, 1961.

HENRY HOSEK, JR. (1959)..... Assistant Professor of Mathematics
B.S., Ball State, 1958; M.A., 1960.

SHIEH-TSING HSIEH (1975)..... Assistant Professor of Electrical Engineering
B.S., Taiwan, 1968; M.S., Tulane, 1972; D.E., 1974.

HARRY H. HUBBARD (1962)..... Coordinator of Evening Administration and Campus Activities with the Rank of Assistant Professor
A.B., Yale, 1949; M.A., New York, 1958.

BARBARA R. HUNDT (1975)..... Veterans Counselor
B.A., Purdue, 1972; M.S., 1974.

CHARLES R. HUTTON (1956) ..... Professor of Architectural Technology
B.Arch., Illinois Institute, 1955; M.S.Arch., 1961.

VIVIENNE JACOBSON (1975)..... Graduate Instructor in Education
B.S., McGill (Canada), 1949; M.S., Michigan, 1950; M.S., Purdue, 1974.

BETTY L. JAHR (1974)..... Assistant Professor of Mathematics
B.A., St. Xavier, 1963; M.S., Ohio, 1965.

MAHAVIR JAIN (1969)..... Associate Professor of Industrial Management
B.A., Punjab (India), 1955; M.A., 1961.

SIN-BAN JEN (1962)..... Associate Professor of Electrical Engineering Technology
B.S., National Hunan (China), 1943; M.S., Kansas State, 1955.

DORIS F. JOHNSON (1975) ..... Assistant Professor of Nursing
B.S., Tuskegee, 1962; M.S., Iowa, 1974; R.N., Indiana.

DOROTHY E. JOHNSON (1969) ..... Acting Dean of the Community College; Professor of Education
B.A., Queens, 1941; M.A., New York, 1947; M.S., Purdue, 1962; Ph.D., 1964.

ROBERT M. JOHNSON (1971)..... Assistant Professor of Physical Education
B.S., Brigham Young, 1967; M.S., Northern Illinois, 1969; Ed.D., Brigham Young, 1971.

BRANIMIR Z. JOVANOVICH (1970) ..... Assistant Professor of Electrical Engineering Technology
B.S., Ilinois, 1962; M.S., Illinois Institute, 1968.

ALBERT L. KAYE (1967-1974) ..... Professor Emeritus of Metallurgical Engineering Technology
S.B., MIT, 1931; S.M., 1932; Sc.D., 1934.

MOREY A. KAYS (1974) ..... Assistant to the Dean of the Community College
B.S.I.E., Western Michigan, 1965; M.B.A., Michigan State, 1970.

JOHN B. KEITER (1974)..... Assistant Professor of Education
B.S., Portland State,1968; M.S., Indiana, 1970; Ph.D., 1974.

EDWARD P. KELEHER (1966) ..... Associate Professor of History
B.S., St. Louis, 1957; A.M., 1959; Ph.D., 1965.

BARBARA E. KIENBAUM (1967) ..... Instructor in German
B.A., Michigan State, 1963; M.S., 1967.

MARGARET A. KLEN ... (1966-1968, 1971-1972, 1975) Associate Professor of Nursing and Practical Nursing Program Coordinator
B.S.N., Indiana, 1952; M.S., 1966; R.N., Indiana.

THOMAS R. KOENIG (1970) ..... Associate Professor of Philosophy
B.A., Villanova, 1957; M.A., DePaul, 1965; Ph.D., Louvain, 1967.

VERN E. KORLIN (1967) ..... Chief, Safety and Security

DONALD R. KURTZ (1968) ..... Associate Professor of Computer Technology
A.A.S., Lyons Township Junior College, 1959; B.S., Illinois, 1961; M.B.A., Chicago, 1967.

ANTHONY J. LAMB (1969)..... Head, Department of Modern Languages. Associate Professor of Modern Languages
A.B., Suffolk, 1959; Harvard, 1961; Ph.D., Kansas, 1968.

LEA M. LANG (1975) ..... Instructor in Practical Nursing
Henry Ford Hospital, 1964; B.S., Olivet Nazarene, 1973; R.N., Indiana.

DOROTHY C. LAWSHE (1973) ..... Associate Director for Trio Programs at Purdue, Calumet Campus, with the rank of Assistant Professor
A.B., Indiana, 1949; M.Ed., Loyola, 1962.

ALBERT L. LAWSON (1971)..... Registrar with the Rank of Assistant Professor
B.S., Indiana State, 1958; M.S., 1963.

HOWARD I. LEE (1966)..... Assistant Professor of Electrical Engineering Technology
B.S., Purdue, 1964; M.A., Roosevelt, 1971.

SAUL LERNER (1967)..... Head, Department of History and Political Science; Associate Professor of History
B.A., Youngstown, 1958; M.A., Kansas, 1961; Ph.D., 1963.

WILLIAM C. LORDAN (1962) ..... Assistant Professor of Mathematics
A.B., Wesleyan, 1954; M.S., Wisconsin, 1960.

B. ANNE LOVELADY (1972) Director of Financial Aids with the rank of Assistant Professor
B.A., Purdue, 1971; M.S., 1973.

CHARLOTTE M. MACY (1973) ..... Professional Counsellor for the Special Services Program
B.A., Indiana, 1971; M.S., Purdue, 1973.

CAROL A. MAGLIOLA (1970) ..... Instructor in Practical Nursing
B.S., St. Xavier, 1966; R.N., Indiana.

BOYD R. MANGUS (1951, 1954, 1958)..... Associate Professor of Speech
A.B., Transylvania, 1940; M.S., Purdue, 1952.

JOHN MANIOTES (1963) ..... Professor of Computer Technology
B.S., Purdue, 1957; M.S., 1958; Ph.D., 1962.

CHARLES J. McALLISTER (1962) ..... Head, Department of Construction Technology; Associate Professor of Architectural Technology
B.S., Illinois 1953; M.S., Illinois Institute, 1966 (Reg. Arch., Illinois).

RICHARD F. McCORMICK (1962)..... Assistant Professor of Mechanical Engineering Technology
B.Ch.E., Ohio State, 1938; M.S., 1939 (P.E., New York).

MICHELE M. McGLINCHY (1975) ..... Graduate Instructor in Administrative Sciences
B.S., Purdue, 1975.

JOHN P. McLAUGHLIN (1969) ..... Assistant Professor of Mathematics Education
B.S., East Texas State, 1954; M.Ed., Texas, 1960; Ph.D., 1969.

BARBARA M. MEEKER (1966) ..... Assistant Professor of Architectural Technology
A.B., DePauw, 1952.

HENRY J. MERRY (1962-1974)..... Professor Emeritus of Political Science
A.B., Michigan, 1931; LL.B., 1936; M.A., American, 1952; LL.M., Harvard, 1954; Ph.D., London (England), 1957.

KENNETH L. MERTENS (1974)..... Supervisor of Data Processing Operations
A.A.S., Purdue, 1974.

CHARLES E. MILLER (1946-1950; 1971)..... Head, Department of Electrical Technology; Associate Professor of Electrical Engineering Technology
B.S., Purdue, 1945; M.S., 1946; Ph.D., 1950.

CHARLES W. MILLER (1967) ..... Associate Professor of Education
A.B., Ball State, 1942; M.A., 1947; Ed.D., Northwestern, 1967.

WALTER E. MINER (1975) ..... Director of Data Systems and Services
B.S., Toledo, 1967; M.S., 1971.

JAL J. MISTRI (1972) ..... Trio Coordinator
Director of Upward Bound
B.A., Bombay (India), 1954; M.A., 1956.

ZENOBIA J. MISTRI (1973)..... Graduate Instructor in English
B.A., Bombay (India), 1960; M.A., 1964.

GEORGE R. MITCHELL (1966) ..... Associate Professor of Physics
B.S., Wisconsin, 1947; M.S., 1948; Ph.D., 1951.

JOHN A. MOHAMED (1971)..... Assistant Professor of Creative Arts
B.S., Indiana, 1950; M.A., Northwestern, 1956.

PEGGY MORAN (1965)..... Assistant Professor of English
B.A., Roosevelt, 1964; M.A., DePaul, 1965.

LINDA S. MURA (1971) ..... Assistant Professor of Sociology
A.B., Grove City, 1966; M.S., Purdue, 1968; Ph.D., 1973.

CATHERINE M. MURPHY (1968)..... Assistant Professor of Mathematics
A.B., Regis, 1962; M.A., Catholic University of America, 1965; Ph.D., 1968.

JOHN W. MYBECK (1965)..... Dean of Community Services; Assistant Professor of Education
B.S., Purdue, 1962; M.S., 1965; Ph.D., 1970.

VICTOR NAMIAS (1966) ..... Associate Professor of Physics
Master, Brussels (Belgium), 1954; Diploma, Nuclear Engineering, 1956; M.S., Carnegie Institute, 1962; Ph.D., 1965.

JOHN C. NEELEY (1975) ..... Assistant Professor of Biology
B.S., Portland State, 1960; M.S., Oregon State, 1963; Ph.D., 1970.

NILS K. NELSON (1962)..... Associate Professor of Chemistry
B.S., Missouri, 1946; M.S., Illinois, 1947; Ph.D., 1949.

GARY H. NEWSOM (1965,1966)..... Vice Chancellor for Administrative Services
B.S., Southern Illinois, 1964.

ROBERT E. NICHOLS, JR. (1965) ..... Professor of English
B.S., Illinois, 1954; M.A., DePaul, 1960; Ph.D., Washington, 1965.

DONALD E. NORRIS (1969)..... Assistant Professor of Supervision
B.S., Northwestern, 1940.

E. JANE NORRIS (1975)..... Instructor in Practical Nursing
B.S., Indiana, 1960; R.N., Indiana.

MAURICE D. O'HERN (1974)..... Assistant Director of Building and Grounds
Ph.B., Northwestern, 1963; M.S., DePaul, 1968.

J. DONALD O'MEARA (1975) ..... Instructor in Sociology
B.A., Cincinnati, 1967; M.A., 1970.

LAURIE ORLICH (1970)..... Assistant Professor of Nursing
B.S., DePaul, 1960; M.S., 1961; R.N., Indiana.

JOY A. O'SHIELDS (1971)..... Instructor in Education
A.B., Michigan, 1961; M.A., Purdue, 1971.

JACK H. PACKER (1964)..... Assistant Professor of Engineering Graphics
B.S., Illinois Institute, 1946; M.S., 1969.

JAMING PAN (1960) ..... Head, Department of Physics; Associate Professor of Physics
B.S., Taiwan Normal (China), 1955; M.S., Northwestern, 1960; Ph.D., Illinois Institute, 1971.

SAMUEL D. PARAVONIAN (1968)..... Head, Department of Education; Professor of Education
A.B., Wheaton, 1951; M.A., Columbia, 1952; Ph.D., Purdue, 1966.

ANDREW J. PARKER, SR. (1964) ..... Associate Professor of Industrial Education
B.S.T., I.E., Purdue, 1940; M.S., 1952.

STEVEN E. PAULEY (1969)..... Assistant Professor of English
B.S., Western Illinois, 1967; M.A., 1968.

ROBERT L. PELOQUIN (1968)..... Assistant Professor of Biological Sciences
B.S., Purdue, 1962: M.A., Stanford, 1964; Ph.D., California, 1971.

LEONARD L. PERKINS (1966) ..... Dean of Students with the Rank of Associate Professor
B.S., Tennessee State, 1959; M.A., Ohio State, 1962.

PHILLIP PERKINS (1970) ..... Assistant Professor of Mechanical Engineering Technology
B.S., Purdue, 1943.

JOHN R. PHILLIPS (1967)..... Associate Professor of Chemistry
A.B., Dartmouth, 1957; M.A., Harvard, 1959: Ph.D., 1962.

TRAVIS J. PHILLIPS (1966) ..... Assistant Professor of Chemistry
B.A., Iowa State Teachers, 1941; M.S., Iowa, 1948; Ph.D., Ohio State, 1957.

DORIS F. PIERCE (1962)..... Associate Professor of Political Science
B.A., East Central State, Oklahoma, 1949; LL.B. (Retroactive change to J.D., 1971), Oklahoma, 1951: M.A., 1954.

JEAN E. PREBIS (1969) ..... Associate Professor of Psychology
B.S., Illinois, 1954; M.A., Chicago, 1962; Ph.D., 1970.

JAMES W. PRINGLE (1962) ..... Associate Professor of History
B.A., Illinois, 1952; M.A., 1956; Ph.D., 1961.

MARGARET E. PRUGH (1967) ..... Assistant Professor of Practical Nursing
A.B., G.N., Indiana, 1944; R.N., Indiana.

JAMES S. QUASNEY (1970) ..... Associate Professor of Computer Technology
B.S., Indiana, 1964; M.S., 1968.

DAVID RADEN (1967) ..... Assistant Professor of Sociology
B.A., Northwestern, 1955; M.A., Chicago, 1963; Ph.D., Wisconsin, 1973.

SVETISLAV RADOSAVLJEVIC (Steve Rados) (1968) ..... Associate Professor of Computer Technology
B.S., Purdue, 1955; M.S., Illinois Institute, 1962; M.A., Chicago, 1963.

ESTHER F. RAMSAY (1954-55, 1965-74)..... Professor Emeritus of Practical Nursing
Chicago Mercy Hospital, 1936; Ph.B., Northwestern, 1955; M.A., Loyola, 1962; R.N., Illinois, Indiana.

JOSEPH C. RAPAL (1948)..... Associate Professor of Electrical Engineering Technology
B.S., Purdue, 1938; M.Ed., Loyola, 1960.

ROSE E. RAY (1970) ..... Associate Professor of Psychology
A.A., Southwest Baptist, 1964; B.A., Ouachita Baptist, 1965; M.A., Baylor, 1969; Ph.D., 1970.

CONNIE A. REBEY (1972)..... Personnel Assistant
B.A., Purdue, 1972.

ESTELLA E. REED (1966) ..... Associate Professor of Education
A.B., Ball State, 1940; M.S., Butler, 1948: Ed.D., Indiana, 1966.

WILLIAM W. REED, JR. (1959) ..... Assistant Professor of Electrical Engineering Technology
A.A.S., Purdue, 1966; B.S., 1970.

NICHOLAS RELICH (1948) ..... Associate Professor of Mathematics
B.S., Illinois, 1937; M.S., Purdue, 1951.

SHELIA A. REZAK (1971)..... Administrative Assistant
B.A., Purdue, 1971; M.L.S., Indiana, 1974.

ROBERT H. RIVERS (1975) ..... Instructor in Education
B.S., Florida State, 1964; M.S., Georgia, 1968.

WILLIAM L. ROBINSON (1975) ..... Instructor in Speech
B.A., Kansas, 1967; M.S., 1972.

ALAN K. ROEBUCK (1964)..... Head, Department of Chemistry; Associate Professor of Chemistry
B.S., Wisconsin, 1936: M.S., 1937; Ph.D., 1947.

C. DAVID ROSE (1965) ..... Associate Professor of Industrial Engineering Technology
B.S., Oklahoma State, 1962; M.B.A., Chicago, 1968 (P.E., California).

GORDON H. ROSENAU (1970) ..... Director of Athletics, Intramurals and Recreation; Assistant Professor of Physical Education for Men
B.S., Indiana, 1959; M.S., 1965.

ANN M. ROSENOW (1974)..... Associate Professor of Nursing
B.S., Macalester, 1965; M.N., Emory, 1969; R.N., Indiana.

CELESTINO RUIZ (1975) ..... Assistant Professor of Modern Languages
B.A., Catholic University (Italy), 1961; M.A., Case Western, 1970; Ph.D., Case Western Reserve, 1974.

ARLENE J. RUSSELL (1968) ..... Assistant Professor of French
A.B., College of Mt. St. Joseph-on-the-Ohio, 1966; M.A., Purdue, 1969.

THOMAS F. RYAN (1968)..... Personnel and Payroll Manager
B.A., Michigan State, 1965.

DOROTHY L. SABOLSICE (1971)..... Assistant Professor of Nursing
St. Margaret, 1949; B.S., Pittsburgh, 1953; M.S., Maryland, 1967; R.N., Indiana.

DAVID SAMUELS (1966)..... Information Officer
B.A., Pennsylvania State, 1942.

ALFRED D. SANDER (1962) ..... Dean of the School of Humanities, Education and Social Sciences; Professor of History
A.B., American, 1948; M.A., Miami, 1950; Ph.D., American, 1955.

NICK G. SCARLATIS (1967)..... Assistant Professor of Architectural Technology
B.A., Illinois, 1963; M.A., 1967 (Reg. Arch., Illinois).

CAROL E. SCHERBA (1974)..... Assistant Professor of Nursing
B.S., Pennsylvania, 1954; M.A., Teachers College, Columbia, 1956; M.Ed., 1967; R.N., Indiana.

MARGARET S. SCHOON (1969) ..... Catalog Librarian; Assistant Professor of Library Science
B.A., Hanover, 1968; M.L.S., Indiana, 1973.

KEITH A. SCHROEDER (1974) ..... Assistant Professor of English
B.A., California State, 1967; M.A., 1969.

ROBERT L. SELIG (1967) ..... Associate Professor of English
A.B., North Carolina, 1954; A.M., Columbia, 1958; Ph.D., 1965.

STANLEY A. SHABOWICH (1971) ..... Acquisitions Librarian: Instructor in Library Science
B.A., Wayne State, 1962; M.S.L.S., Western Michigan, 1966.

MARY JO SHEA (1970) ..... Assistant Professor of English
B.A., Purdue, 1966; M.A., Wisconsin, 1967.

WILLIAM F. SHEAHAN (1968) ..... Director of Placement with the Rank of Assistant Professor
B.A., DePaul, 1960; M.Ed., 1969.

ELLSWORTH R. SHEPHARD (1975)..... Professional Counsellor for Special Services
B.A., Reed, 1937; M.A., Chicago, 1965.

THOMAS D. SHERRARD (1966)..... Director, Urban Development Institute; Professor of Urban Studies
B.A., Reed, 1937; M.A., Chicago, 1955.

JANE R. SHOUP (1966) ..... Head, Department of Biology; Associate Professor of Biological Sciences
A.B., Rochester, 1962; Ph.D., Chicago, 1965.

DAVID E. SIMPSON (1967)..... Assistant Professor of Creative Arts
B.S., Purdue, 1946; M.A., Columbia, 1951.

DAVID G. SKITEK (1973) ..... Assistant Professor of Electrical Engineering
B.S., Missouri, 1967; M.S., Arizona State, 1969; Ph.D., 1973.

DOROTHY J. SLAMKOWSKI (1970) ..... Associate Professor of Nursing
B.S., Marquette, 1958; M.S., 1959; R.N., Indiana.

WILLIAM H. SMEAD (1967) ..... Associate Professor of Education
B.S., Ball State, 1949; M.A., Western State, 1954; Ph.D., Purdue, 1969.

BEVERLEE A. SMITH (1966) ..... Assistant Professor of English
B.A., St. Xavier, 1962; M.A., Loyola, 1964; Ph.D., Chicago, 1971.

JAMES A. SMITH (1968) ..... Assistant Professor of Mathematics
B.S., Ball State, 1959; M.A., 1960; Ph.D., Tennessee, 1968.

GLORIA J. SMOKVINA (1970)..... Associate Professor of Nursing
B.S., DePaul, 1964; M.S., Indiana, 1966; R.N., Indiana.

NIKOLA M. SORAK (1968)..... Associate Professor of Electrical Engineering Technology
B.S., Belgrade, 1957; M.S., Illinois Institute, 1968.

CLEMENT S. STACY (1971) ..... Assistant Professor of English
B.A., Carroll, 1960; M.A., Northern Illinois, 1971.

SIGRID STARK (1946-1971)..... Professor Emeritus of English
B.E., Wisconsin State Teachers, 1933; M.A., Northwestern, 1938.

SHIRLEY F. STATON (1970) ..... Assistant Professor of English
B.A., Douglas, 1950; M.S., Iowa State, 1958; Ph.D., Purdue, 1971.

KARL H. STEINER (1963)..... Associate Professor of Electrical Engineering Technology
M. Radio Tech., Bundeslehranstalt (Austria), 1936; Dipl. Ing., Austrian Federal Government, 1952; Ps.D., College of Divine Metaphysics, 1961; Ph.D., Walden, 1974; P.E., Washington, Oregon, British Columbia, Illinois.

WILFRED A. STOCK (1946-1974) ..... Professor Emeritus of Mathemetics
B.S., Lewis Institute, 1935; M.A., Northwestern, 1938.

JUDITH K. STRYCZEK (1966)..... Associate Professor of Nursing
St. Mary Mercy Hospital, 1961; B.S., Indiana, 1964; M.S., 1966; R.N., Indiana.

GENE R. SULLIVAN (1967)..... Coordinator of Facilities Development and Scheduling; Assistant Profesor of Architectural Technology
A.A.S., Purdue, 1963; B.S., 1965; M.S., 1968.

FRANK SUSIENKA (1956)..... Instructor in Physics
Ph.B., Northland, 1951.

MICHAEL SVONAVEC (1962)..... Assistant Professor of Physics
B.S., Slovakia (Czechoslovakia), 1945; M.S., DePaul, 1955.

MARY ANN THOMAS (1971)..... Assistant Professor of Nursing
Homer G. Phillips School of Nursing, 1956; B.S., Indiana, 1968; M.A., Valparaiso, 1973; R.N., Indiana.

CHARLES B. TINKHAM (1955)..... Associate Professor of English
Ph.B., Chicago, 1949; B.S., Wisconsin, 1952.

SANDRA TREFFINGER (1973) ..... Bursar
B.A., Miami U., (Ohio), 1970; M.A.T., Indiana, 1973.

PAUL H. TRESS (1975)..... Instructor in Sociology
A.B., Cornell, 1968; M.A., Michigan State, 1971; M.S., 1973.

CLIFFORD TRIMBLE (1966)..... Associate Professor of Education
A.B., Eastern Kentucky State, 1955; M.S., Purdue, 1957; Ph.D., 1967.

DANIEL J. TROY (1967)..... Associate Professor of Mathematics
B.S., St. Louis, 1953; M.S., 1958; Ph.D., 1961.

STEPHEN TRUCHAN, Jr. (1973)..... Instructor in Civil Engineering Technology
B.S., Purdue, 1971.

NORMAN L. TRUSTY (1964) ..... Associate Professor of History
A.B., William and Mary, 1956; A.M., Boston, 1957; Ph.D., 1964.

CHARLES C. TSENG (1975) ..... Associate Professor of Biology
B.S., Taiwan Normal, 1955; M.S., National Taiwan, 1957; Ph.D., California, 1965.

JOHN S. TUCKEY (1953) ..... Assistant Dean of the Graduate School; Head, Department of English and Philosophy; Professor of English
A.B., Notre Dame, 1944; M.A., 1949; Ph.D., 1953.

DOROTHY R. UNDERWOOD (1958) ..... Admissions Assistant

RICHARD A. VAN ORMAN (1966) ..... Associate Professor of History
B.A., Michigan State, 1958; M.A., 1960; Ph.D., Indiana, 1964.

EDWARD L. VOCKELL (1972) ..... Assistant Professor of Education
A.B., Athenaeum of Ohio, 1967; M.Ed., Xavier, 1969; Ph.D., Purdue, 1972.

EVELYN H. VONDRAN (1972) ..... Assistant Professor of Education
B.A., Briar Cliff, 1957; M.A., Purdue, 1968; Ph.D., 1971.

HAROLD B. VON HORN (1965) ..... Associate Professor of Computer Technology
Ph.B., Northwestern, 1955; M.S., Wisconsin, 1956.

RONALD J. WAGENBLAST (1964) ..... Associate Professsor of Mathematics
B.S., Illinois Institute, 1954; M.S.T., 1964.

JERRY WATERS (1975) ..... Professional Counsellor for Special Services
B.A., College of Wooster Ohio, 1972 M.A., Chicago, 1974.

BARBARA A. WATTS (1973) ..... Assistant Professor of Nursing
A.A., Graceland, 1954; B.S., Missouri, 1955; M.A., Iowa, 1973; R.N., Indiana.

RAYMOND S. WEISLER (1970) ..... Associate Professor of Industrial Management
B.A., Chicago, 1963; J.D., John Marshal Law School, 1963; M.B.A., Chicago, 1965 (C.P.A., Illinois).

JERMONE F. WERMUTH (1969) ..... Assistant Professor of Biology
B.S., Wisconsin, 1957; M.S., 1960; Ph.D., Indiana, 1968.

ROBERT J. WERTH (1969) ..... Assistant Professor of Biology
B.S., St. Benedict's, 1961; M.S., Missouri, 1965; Ph.D., Colorado, 1969.

KENNETH S. WILSON (1950-53, 1954) ..... Professor of Biological Sciences
B.S., Colorado College, 1949; M.S., Wyoming, 1950; Ph.D., Purdue, 1954.

ROSEMARY M. WOZNIAK (1973) ..... Assistant to the Chancellor
B.S., Indiana State, 1975.

WILLIAM R. WRIGHT (1970) ..... Director of Continuing Education; Assistant Professor of Education
B.S., Illinois State, 1958; M.Ed., Illinois, 1961; Ph.D., Purdue, 1970.

THOMAS M. YACKISH (1969) ..... Associate Professor of Electrical Engineering Technology
B.S., Purdue, 1960; M.S., Illinois, 1962.

N. DOYAL YANEY (1960) ..... Assistant Professor of Chemistry
B.S., Geneva, 1948; M.S., Ohio State, 1950.

RICHARD L. YATES (1967) ..... Executive Assistant to the Chancellor; Professor of Mathematics
B.S., Florida Southern, 1952; M.A., Florida, 1954; Ph.D., 1957.

EILEEN C. ZACHER (1953) ..... Associate Professor of Mathematics
B.S., Chicago, 1937; M.A., Loyola, 1942.

VERA L. ZOLBERG (1974) ..... Assistant Professor of Sociology
B.A., Hunter, 1953; M.A., Boston, 1956; Ph.D., Chicago, 1974.

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PURDUE UNIVERSITY
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2233 171st STREET
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